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PRIMARY BRONCHOGENIC CARCINOMA.¹

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In investigating a subject so protean in its manifestations and so insidious in its onset, a rapidly mounting literature is evidence of the lively attention that is being bestowed on the problem of bronchogenic carcinoma. It is agreed that X rays and bronchoscopy have carried us much further in establishing a definite diagnosis, although, unfortunately, such diagnosis is too often at an advanced stage of the disease.

While the argument as to its real or apparent increase in the community wages, there is no doubt that many undiagnosed cases of earlier days now figure correctly in the statistics, thanks to technical aids and the advent of the "lung-carcinoma-minded" physician in suspecting this disease. We are dealing with a disease which constitutes between 5% and 10% of all carcinomata and which in the State of New South Wales in the year 1932 accounted for the deaths of 36 males in 1,405 cancer deaths and 15 females in 1,129 cancer deaths. In 1933, 43 males and 8 females, and in 1934, 35 males and 17 females died of lung carcinoma. A survey of records, however, leads one to feel that these figures would be higher if accurate *ante mortem* diagnoses could be established in all cases; for it must be remembered that *ante mortem* diagnosis, in the present state of our knowledge, is not always finalized or correct and *post mortem* diagnosis not always obtainable in doubtful cases.

¹Read before a meeting of the Section of Oto-Rhino-Laryngology of the New South Wales Branch of the British Medical Association on December 10, 1935.

Rogers, in a series of 50 autopsies, concluded that in 44% first symptoms were produced by the metastases rather than the primary tumour. Hill, in his series, found that "in about 15% of the cases there were no symptoms referable to the respiratory tract". Manges, in 1932, stated that "fully one-third of the cases of primary carcinoma of the lung are not subject to antemortem diagnosis at present".

Such are the difficulties that beset us, and their recognition should spur us on to closer coordination and the development of improved diagnostic technique in all departments.

The cry for earlier diagnosis may bring a response from the profession at large; but there remains the series of Rogers, Hill and Manges, above mentioned, which would still evade us.

To this section of bronchoscopists, familiar as its members are with the appearance of bronchial neoplasm, there is no need to stress the fact that the pathologist's report on a biopsy snipping obtained by direct bronchoscopy is the only certain method of diagnosis in common use today, except when a specimen is taken from the periphery of the lung. This class of patient, however, does not present himself direct for bronchoscopic examination, and only after tuberculosis, hydatid, lung abscess, syphilis and the many diseases which carcinoma simulates have been excluded, is the aid of the bronchoscope invoked. Positive evidence gained by the taking of a biopsy snipping is now a frequent occurrence; but it should be stressed that negative findings do not exclude carcinoma. Particularly is this so in the case of neoplasm of the upper lobes and peripheral cancer.

CASE I.—The patient was C.A.M., aged fifty-three years (see Figure I). Examination of the sputum revealed no tubercle bacilli. There was no reaction to the Wassermann or Casoni test. Bronchoscopic examination on three occasions revealed pus issuing from the right upper lobe bronchus; but there was no rigidity, no fixation or any other sign of neoplasm. Skiagrams revealed a spherical shadow in the right upper lobe, much closer to the anterior than to the posterior surface, possibly hydatid, most probably newgrowth. A lipiodol X ray examination showed a mass in the upper half of the right lung, probably hydatid. *Post mortem* examination revealed a carcinoma, eight centimetres in diameter, almost spherical in shape, just below the right apex. Metastases were present in the liver and mediastinal glands.

A finalized *ante mortem* diagnosis was never reached in this case by the methods in common use.

Should a neoplasm be visible bronchoscopically, the skilled eye may regard it as evidence of malignant disease beyond doubt, and indeed it may be unwise to attempt to take a biopsy snipping. Pulsation, especially of an expansile character, would obviously contraindicate such a procedure.

CASE II.—The patient, H.C.C., was forty-nine years of age. Skiagrams revealed marked opacity in the right lower lobe, suggesting markedly thickened pleura with probably very small effusion. The trachea was drawn to the right, suggesting an atelectasis, possibly due to neoplasm. On bronchoscopic examination the left bronchial tree appeared normal; but in the right lower lobe bronchus was an irregular granulated area, suggestive of neoplasm. It was so extremely vascular that a biopsy was not attempted. (See Figure II.)

To attempt the taking of a snipping from such a vascular neoplasm would be surgically unsound; but from the bronchoscopic appearances there would be no hesitation in pronouncing such a lesion malignant. Jackson has stressed that rigidity, fixity and deformity of the bronchial walls justify a tentative diagnosis of malignant disease. From such hardness and the extent of the compression we may at least deduce the presence of lesions compressing the bronchi from without. The broadening of the carina sometimes seen comes into the same category.

CASE III.—The patient was H.A.H., aged thirty-four years. Bronchoscopic examination revealed abnormality of the left main bronchus, with bulging of the left posterolateral wall and narrowing of its lumen. A tentative diagnosis of malignancy was made. Skiagrams showed the mediastinal shadow, especially the superior mediastinum, to be definitely increased. The heart was displaced towards the right. The appearance suggested newgrowth, involving the mediastinum, and pleural effusion on the left side.

The frequent finding of pus within the bronchi (Figure I) must in no way mislead us; for it is well known that secondary pulmonary suppuration may overshadow the presence of a neoplasm. Bronchial obstruction accounts for this, and for the same reason atelectasis (Figures III and IV) is not uncommon. The resultant X ray shadow, for the same reason, in no way delineates the neoplasm, but merely reveals the extent of its secondary complications.

Bronchoscopic drainage of a pus-filled bronchus and temporary diminution of the obstruction allow of a recovery from ciliary stasis and improved ventilation with a marked diminution of the X ray shadow. Mistakes have been made in attributing such diminution to shrinkage of the neoplasm under radiation or other treatment, instead of to its real cause, namely, improved bronchial drainage and aeration.

To quote Chandler, Finzi and Maxwell:⁽¹⁾ "Some workers consider lipiodol undesirable in a lung which is to be subjected to irradiation on the ground that residual lipiodol gives out secondary radiations of long wave length, which cause damage and necessitate curtailment of the requisite course of treatment." There are those present who are competent to express an opinion on this statement, and I should like to hear their views.

Should lipiodol be not contraindicated, a method of Farinas⁽²⁾ is worthy of mention, in which, by serial, screen and film studies in changing positions, taken during lipiodol injection, he claims from studies of the shape of the bronchial outlines to differentiate early malignant lesions. Farinas states that a Röntgenogram made after the injection of iodized oil has little value; but it is necessary to take a series of Röntgenograms at the best angle possible, so that we can study with certainty any small alteration of the aspect and contour of the bronchus. Under the screen, the patient is turned slowly from side to side in order to observe these

bronchi from different angles. Several films are exposed in these different positions at whatever moment it is wished to record what is observed on the screen. He claims that by "serial bronchography" the X ray signs of bronchial carcinoma will change according to the type of tumour. The polypoid type shows a filling defect which, when observed *en face*, manifests itself as a negative shadow, and when observed in profile has the appearance of a notch on the bronchial contour. The negative shadows, the notches, the concentric stenosis and the irregular bronchial cavities with diffuse borders are the signs of bronchogenic carcinoma in its early stages.

Of the many methods of introducing lipiodol, its introduction through the bronchoscope under direct vision seems most desirable. By this method the bronchial tree can first be sucked free of all secretions and narrowed strictures overcome, the oil being thus allowed to pass an otherwise impenetrable barrier of pus. Moreover, it may be introduced exactly at the orifice of a suspected bronchus, as in Case I.

Can any light be thrown on the peribronchial extent of the tumour, and is the lesion accessible to the bronchoscope on the one hand or the thoracic surgeon on the other?

In the present state of our knowledge it would appear impossible to deduce this from the bronchoscopic findings alone. I have never yet seen a pedunculated carcinoma within a bronchus. It is known that this type is extremely rare, but does occur, and is removable through the bronchoscope.

Almost always, growths seen bronchoscopically are peribronchial growths, seen after the endobronchial intrusion of the growth; but we know not their peribronchial extent. Obviously, to apply radon or radium to such a growth is only playing on the periphery of a lesion whose extent is quite unknown and whose mediastinal glands are almost certain to be involved, for, be it remembered, early diagnosis is practically impossible at present. Bronchoscopic application of radon and radium have been tried extensively; but we await reports on any case cured according to the accepted five-year standard, in which the biopsy report has been rechecked and found correct.

Manges,⁽³⁾ of Philadelphia, dealt with the analysis of twenty-seven cases biopsied by bronchoscopy and treated by X rays. All were regarded as malignant, but when later they were restudied and reclassified no less than five were reclassified as benign. All five patients were alive from nine years to three years since first irradiated, showing how pathological reports may vitiate statistics.

Chandler, Finzi and Maxwell reported on ten cases treated by radium or radon through the bronchoscope. The results in the series were definitely discouraging. A diagnosis of malignancy could be established from sputum and pleural effusions, although the cytologist's aid had seldom been sought in this direction.

There is described by Martin and Ellis a method of biopsy by needle puncture and aspiration of tumours lying below the body surface. Sharp⁽⁴⁾ (1931) described a series of three cases in which a diagnosis of carcinoma was made by this method from the needle smear.

If pleural fluid is present, Mandlebaum's method may be used. The fluid is centrifuged, the sediment fixed in formalin, sectioned and stained like any other tissues. I should like to hear the views of the pathologists present on this method.

If, as a generalization, radical excision of lung tumours must usually be confined to those situated near the cortex of the lung, this diagnostic method may be helpful.

From recent reports to hand, "sputum section" seems to have progressed to such an extent by what is known as an "extension of the wet film method" that this method will no doubt come into general use in sputum testing for carcinoma.

Dudgeon and Wrigley⁽⁵⁾ described the technique of the method as adapted to examination of sputum. In 68% of proved cases of carcinoma of lung or larynx it was possible to establish the diagnosis from the examination of the sputum, and in the majority of instances the histological type of growth present could be distinguished. Perfect specimens of the particles of malignant growth were obtained in many cases, and the histological features of the various types of malignant cells were described in detail. The relative frequency of the various types in this series roughly corresponded with that found by Hill in 1934, who found that just over 50% were oat-celled, about 20% were squamous-celled, the remaining types being columnar, spheroidal, polygonal-celled *et cetera*.

Here, then, is a diagnostic method which should be practised as a routine in suspected cases, just as is the sputum test for tuberculosis.

It would seem from a survey of case histories that both sputum section and pleural effusions were seldom examined for cancer cells in this country.

The radiotherapeutic diagnostic test may be used. It is known that true bronchogenic carcinoma is resistant to radiotherapy.

It has been my endeavour throughout this paper to bring to your notice salient features for discussion rather than to give a general review of a subject in which this section, from the bronchoscopic point of view, is already well versed. You will, therefore, forgive the deliberate exclusion of much routine matter.

An exposition of newer technical methods were useless unless a compulsory system of team work sprang automatically into action in dealing with these cases.

The establishment of a thoracic clinic would seem the logical answer to the problem, not only of earlier diagnosis, but also of earlier treatment.

The natural conservatism of our profession ordains that patients with blood-stained sputum or pleural effusion should be sent to medical wards,

simply because it was the custom of half a century ago to associate hæmoptysis with tuberculosis. Yet Hill (1934), reviewing 513 cases of primary cancer of the lung recorded in the literature, states that "47% of these had blood in the sputum at some stage of the disease".

Here are cases of a nature suited for investigation or treatment by some six departments if modern standards are to be accepted, namely, the departments of X rays, pathology, bronchoscopy, medicine, radiotherapeutics and thoracic surgery, and there is no doubt that if a committee were formed, comprised of representatives of all six departments, a higher percentage of *ante mortem* diagnoses would be established.

If this short paper should hasten the formation of such committees, the effort will not have been in vain.

Finally, the cases of lung carcinoma at the Royal Prince Alfred Hospital over the last five years in which bronchoscopy was performed number eight, of which in three there was positive biopsy of carcinoma; one showed vascular newgrowth, on which the taking of a biopsy was contraindicated (it appeared definitely malignant); in one there were bulging and constriction of a bronchus; two showed only bronchial pus; in one no evidence of newgrowth was seen.

Acknowledgement.

I desire to express my thanks to my colleagues of the honorary staff of the Royal Prince Alfred Hospital for putting at my disposal all material and case histories concerned in the compilation of this paper.

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DENTAL DECAY AS AN INDEX OF MALNUTRITION.*

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Of all the organs in the body, none is so frequently the subject of disease as is the organ of mastication.

In the ancient peoples dental disease was rare. Amongst the lower animals and some races of the present day it is still rare, but civilized races,

especially the English-speaking race, are almost universally affected. It is safe to say that there is not one amongst us here tonight who is not himself the victim of dental disease.

The Evidence Associating Dental Disease with a Defective Diet.

Dental decay is almost wholly dietetic in origin. This is overwhelmingly supported by the evidence of the historic past, as well as of the present.

Elliot-Smith,⁽¹⁾ when Professor of Anatomy in Cairo, did much research work on Egyptian mummies. He found that there was no caries in mummies of those who lived about 3,500 years B.C. The diet of those Egyptians, who were mostly slaves and labourers, consisted of hard bread made from unrefined cereals, vegetables and other natural foods. Later on, as civilization progressed and the people began to eat larger proportions of refined cereals and soft foods, dental caries became common.

This is the experience of all other races as they come into touch with civilization and its diet.

Eskimos,⁽²⁾ living in isolated regions beyond the reach of civilization, have excellent teeth. When they come into contact with the trader and barter away their furs for the white man's food, instead of living on the proceeds of the hunt, they too develop dental disease. Till quite recent times, the condition of the teeth of the Icelanders was excellent. Since they began to import foods, such as sugar and cereals, caries has made its appearance amongst them as elsewhere.

Dental disease is almost unknown in the desert fastness of Arabia, but, for the reason already given, it is common in the more closely settled areas near the coast.

Lady Cilento⁽³⁾ has stated that the natives of New Guinea who have come into contact with the white man and adopted his food have developed dental caries, whereas the great majority who still live in their original environment are free from it.

The Maoris⁽⁴⁾ had the finest teeth in the world when living on their native diet, but today 95% of the Maori children, living as they do under European conditions, suffer from dental disease.

Dr. Minty,⁽⁵⁾ who recently spent several years in Tonga, informs me that the Tongans had splendid teeth many years ago when they lived on their native foods alone. Now that biscuits and tinned foods have entered largely into their diet, the condition of their teeth is appalling. All have dental caries from infancy and all over the age of eighteen years are badly affected with pyorrhœa.

Tristan da Cunha is a lonely island in the South Atlantic about midway between the Cape of Good Hope and Cape Horn. It was colonized by people from whaling ships and was once a busy whaling station, but now, I understand, a vessel calls only every second year. Its inhabitants live almost entirely on fish, dairy products and potatoes. Among them dental caries is exceedingly rare. Some of these islanders emigrated to the Cape Province of South Africa, where they adopted the diet of the

* Read at a meeting of the Queensland Branch of the British Medical Association and the Queensland Branch of the Australian Dental Association on May 1, 1936.

South African, and as a result also developed dental disease.

Dr. Nye⁽⁶⁾ in a recent article stated that in North Queensland, where aborigines still abound, the natives who had adopted the white man's diet had bad teeth, whereas those living away from civilization had perfect teeth.

Mr. Haenke,⁽⁷⁾ who directs the dental work in the Queensland Department of Public Instruction, in an address in 1928 to a gathering similar to this, referred to observations he made at an aboriginal school he had inspected. Very little caries was seen at his first examination. The school was handed over to a religious body and when inspected some years later the children were found to have four or five times as much dental caries as on the previous examination. He considered this was due to the addition to the diet of such foods as sweets, biscuits and refined foods generally.

Many examples in addition to these I have mentioned have been recorded from time to time, in which races free from dental disease have developed it after coming into touch with civilization. Nothing, other than the alteration in diet, can account for the invariable appearance of dental disease in these peoples. Obviously the diet of civilized man is defective and incapable of maintaining normal health.

The Manner in which Diet Influences Dental Disease.

Diet may influence dental disease in two ways: first, in a general way, by providing or failing to provide all the materials in satisfactory amounts for the building of strong, sound teeth; and, secondly, by its local action. This local action may take the form of a direct attack upon the structure of the teeth, or the nature of the diet may be such that little mastication is needed and the teeth suffer from disuse.

The General Influence of Diet.

No one can say which of these factors has the greater influence in the causation of dental disease. There is no possible way of determining this, but present-day opinion tends to favour the view that

the general effect of the diet has the greater influence.

More and more emphasis is being laid on the need for a general balanced ration for the body as a whole. Our diet should be based not on minimum or maximum requirements, but on optimum requirements, which are the physiological ideal.

During the last few months there has been a marked change in the science of nutrition.⁽⁸⁾ Previously, the measure that guided the food habits of all civilized peoples was the calorie, or so-called energy-producing unit. It has now been shown that there is no satisfactory single measure of food value. The present-day idea is that a particular foodstuff can be judged from the standpoint of nutrition only in so far as it is a part of a combination that is qualitatively complete and quantitatively sufficient.

It is well, at this stage, to draw attention to the valuable work which has been done by Sherman⁽⁹⁾ and Stiebeling⁽¹⁰⁾ on the minimum requirements of calcium, phosphorus and the vitamins. They found that the average person needed every day 0.9 gramme of calcium, 1.32 grammes of phosphorus, 15 milligrammes of food iron, 50 milligrammes of iodine, 4,000 units of vitamin A, 300 units of vitamin B₁ and 500 to 600 units of vitamin C. Table I⁽¹¹⁾ shows the quantities of nutrients required for individuals each day.

Universal attention is now being focused on the matter of diet as a result of the report of the League of Nations Commission on the Physiological Bases of Nutrition.⁽¹²⁾

Foodstuffs are divided into two kinds: the foundation foods and the supplementary foods. The Commission also called the foundation foods protective foods, because they protected the individual against the results of the deficiencies of the dietaries in common use. The foundation foods are five: milk, fresh raw fruit and vegetables, potatoes, meat (which includes liver and kidney) and dairy products from well-fed animals. While a simplified and satisfactory diet can be devised from these foods alone, variety in diet tends to safety.

TABLE I.
Quantities of Nutrients Required for Individuals per Day. (Stiebeling.)

Individuals by Age, Sex, and Activity Groups.	Dietary Allowance in:						
	Energy Value.	Protein.	Calcium.	Phosphorus.	Iron.	Vitamin A. (Sherman Units.)	Vitamin C. (Sherman Units.)
	Calories.	Grammes.	Grammes.	Grammes.	Grammes.		
Child under 4 years.	1,200	45	1.00	1.00	0.005-0.009	3,000	75
Boy 4 to 6, girl 4 to 7 years	1,500	55	1.00	1.00	0.008-0.011	3,000	80
Boy 7 to 8, girl 8 to 10 years	2,100	65	1.00	1.00	0.011-0.015	3,500	85
Boy 9 to 10, girl 11 to 13 years.	2,400	75	1.00	1.20	0.012-0.015	3,500	90
Moderately active woman, boy 11 to 12 years, girl over 13 years	2,500	75	1.00	1.20	0.013-0.015	4,000	95
Very active woman, active boy 13 to 15 years	3,000	75	0.88	1.32	0.015	4,000	100
Active boy over 15 years	3,000-4,000	75	0.88	1.32	0.015	4,000	100
Moderately active man	3,000	67	0.88	1.32	0.015	4,000	100
Very active man	4,500	67	0.68	1.32	0.015	4,000	100
Average per head of the population	2,810	68	0.9	1.23	0.013-0.014	3,800	95

Generally speaking, the daily quantities of these foundation foods should be:

Milk, one and a half pints.
Meat, including fish, liver, kidney or poultry, 4 ounces.
Egg, one.
Cheese, 2 ounces.
Butter, 3 ounces.
Green and leafy vegetables (raw lettuce or cooked cabbage), 3 ounces.
Potatoes, 8 ounces.
Three pieces of raw fruit a day and a serving of two seasonable vegetables.

As regards the supplementary foods, the consumption of white flour should be reduced and partially or wholly replaced by lightly milled cereals and, especially, potatoes. These foods will provide all the vitamin and mineral constituents required, and will, moreover, provide the balance that is so necessary in adequate nutrition.

Evidence⁽²⁾ is available to prove that 86% of the civilized peoples of the world suffer from dental disease. Except in the case of the well-to-do, there was very little dental disease in the British Isles up to the middle of the seventeenth century. Recently collected statistics reveal an appalling deterioration today in the condition of the mouths of the people.

The main change in the diet of the British people from the seventeenth century onwards seems to have been in the increasing consumption of sugar and the use of refined cereals, such as white flour. Sugar was first brought from Mexico to England in 1563, and since then its consumption has greatly increased. In 1700 the amount of sugar per head consumed each year in England was four pounds; in 1800, seventeen pounds; in 1900, about eighty pounds; and in 1931, ninety-six pounds. The present consumption of sugar per head in Australia is one hundred and twelve pounds; that is, each man, woman and child in the country consumes more than one-quarter of a pound of sugar in one form or another each day. Figure I illustrates the increase in the consumption of sugar in England.

Highly milled cereals did not come much into use until the beginning of the nineteenth century. Now, white bread and white flour are amongst the main articles of the people's diet.

Prior to the discovery of America we had no sugar, no potatoes and no highly milled cereals. Hence also there were no jams, cakes, biscuits or sweets. The purest form of sugar obtainable by the people was honey, which must have been a rare delicacy, as there was little or no domestication of bees. Thus the consumption of carbohydrate in all its forms as food has vastly increased in the last few hundred years.

Before the War only 5% of British children entering schools were free from dental caries.⁽¹⁾ Immediately after the War 44.4% were free. It was thought that the harder diet of the War period and the stale bread made of less refined flour mixed with potato substance, together with the rationing of sugar, sweets and all luxuries, were the only possible

means of accounting for this difference. There was a great restriction in the supply of sugar, the imports having been halved.

It may be objected that since the utilizable product of all carbohydrate is glucose, the case

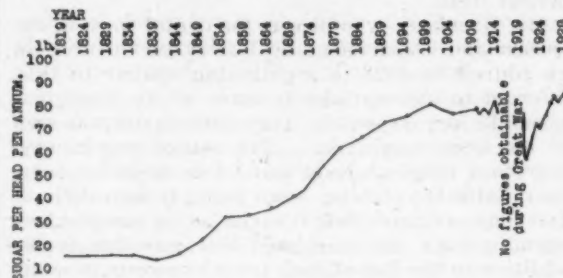


FIGURE I.

Estimated quantity of sugar consumed per head of the population of the United Kingdom during each of the years indicated. Figures from Statistical Office of Custom House, London. (From *Edinburgh Medical Journal*, Volume XXXIX, Number 2, 1932, page 557.)

against sugar in particular falls to the ground. Sucrose may be especially harmful when consumed in excess, for J. H. P. Paton⁽¹³⁾ states:

1. It is a pure chemical substance, $C_{12}H_{22}O_{11}$, devoid of all those accessory food factors (vitamins, salts, etc.) with which it is associated in the plants from which it is extracted.
2. If absorbed unchanged (as has been shown to occur when consumed in excess), it is excreted as sucrose by the kidney. It is possible that it exerts a toxic effect in its passage through the blood.
3. Its digestion and absorption (as invert sugar) takes place with much greater rapidity than is the case with starches. As McLeod, Ramsay and others have pointed out, the velocity with which glucose is absorbed is of even more importance than the quantity taken.
4. The levulose fraction of invert sugar may, if it reaches the systemic blood, exercise a toxic effect. Furthermore, it is evident that the absorption of 50 lbs. of levulose annually (that is, the product of 100 lbs. sucrose), which is greatly in excess of the amount derived from all natural foods, must throw a great strain on the liver.
5. In so far as sugar displaces natural foodstuffs, vitamin and other deficiencies may result.

Many other articles in our diet in addition to sugars, which are used to excess, and refined cereals have been considered as influencing the incidence of dental decay. Insufficiency of each of the known vitamins has been indicted, also of the mineral salts, especially calcium, phosphorus and iron. No single factor in our diet is the cause of dental caries. It is due to a combination of factors.

Needless to say, there is no special diet for the development of sound teeth, any more than there is a special diet for the development of any other part of the body. Calcium and phosphorus are not needed for the building of teeth and bones alone. They are needed elsewhere also. It would be disastrous if, for example, our nervous system and blood were starved of these elements. The diet for the maintenance of normal teeth is the diet of general good health.

Except in early infancy, the visible effects of malnutrition are seen first in the teeth. The further the departure of the individual from a proper diet, the more marked is the corresponding defect in the teeth. As Mr. Haenke⁽⁷⁾ remarked here in 1928, the lowest incidence of dental caries in Queensland school children occurred in those attending aboriginal schools, schools in certain fruit districts and some schools in the remote areas of the State, where our more highly refined foods, such as biscuits and sweets, were not obtainable, and the people had to depend more on the natural products of the land. Where there was a pronounced variation in the incidence of caries in different areas of the State, and sometimes in different schools in the same locality, it could always be ascribed to two factors: diet and function.

Dr. N. M. Gutteridge⁽¹⁴⁾ informs me that he made a survey of the teeth of the aborigines at Palm Island in 1926. From the diseased condition of their teeth he was able to estimate the length of time each aborigine had been on the island, eating the diet of civilized man. These estimates were later verified by the superintendent of the settlement.

The ante-natal clinics were established in Queensland in conjunction with the baby clinics in 1929. In a recent private communication, Mr. Haenke⁽¹⁵⁾ has stated that the work of the baby clinic nurses in improving dental development of children through pre-natal instruction to mothers, has been apparent in certain places. Whereas the percentage of sound mouths amongst the entrants to school in these areas in each year was previously 3% to 8%, the finding is now 10% to 18%. He states that the work of the baby clinic officers is the only factor to which this gratifying improvement is traceable; a similar improvement is not evident in the admissions to schools in centres where baby clinics do not exist.

In the baby clinics themselves it is unusual to find dental caries in any child who has been a regular attendant at the clinic and whose mother has carried out its instructions. There are also casual attendants who visit the clinic for medical advice only when in trouble. Such mothers do not bring their children for general supervision of their feeding, and, generally speaking, such children are badly fed. The condition of the teeth of these children is often bad, and in most cases dental caries is prevalent. In fact, one can judge from the condition of the teeth whether the mother has adhered to the diet recommended or not.

One frequently sees children who appear to be in perfect health and yet have very bad teeth. In these cases the only clinical evidence of the defective diet is found in the teeth, though later other evidence may appear. After early infancy the teeth are the first structures to show the consequences of a defective diet. Their condition is the most delicate guide to a person's nutrition.

Apart from general impressions, there are several instances that illustrate the general influence of diet as a factor in dental disease.

Now and again one sees an infant whose teeth have begun to decay almost as soon as they have erupted; that is, long before any local action of the diet could have brought about decay in a sound tooth. In these cases it is the mother's diet that is defective. The temporary teeth are formed before the baby is born; therefore the influences favouring the formation of good teeth must operate during intrauterine life. I have seen two or three cases such as these in which the mother has been ill, with vomiting, throughout pregnancy. She has had to select the foods which she was best able to retain, not the ideal diet one would recommend. Also, much of the food taken was vomited. In one family that I have in mind, the mother was especially ill on account of the vomiting with her first and fourth children, though she was anything but well with the other two. The first and fourth children had dreadful teeth, and the incisors decayed soon after eruption. The fourth child is now three years of age; every tooth is decayed, and there is an abscess under one of the upper incisors. Every care has been taken in the matter of repairing the teeth, and all but one or two have been filled, but the abscessed tooth will have to be removed. The other two children had some carious teeth, but the teeth are infinitely better than those of the first and fourth.

It is probable that a defective maternal diet has a less harmful influence on the formation of the temporary teeth than the defective diet of the infant, for Nature draws upon the mother's reserves of material necessary for forming the baby's teeth. As evidence of this, the incisors, which are in the most advanced state of development at birth, are usually better calcified than the later developed molars, which have to depend to a greater extent on the infant's diet.

From the mother's point of view it is especially important to provide adequate reserves of dietary constituents. Under the usual dietetic conditions at the time of conception her reserves are generally low, and, if a sufficient supply of necessary food material is not provided, the infant will draw its requirements from the mother's bones, teeth and other organs.

Now that minimum dietary requirements have been ascertained for most food elements, it has been possible for the Commission of the League of Nations,⁽¹²⁾ already mentioned, to draw up in general terms a minimum dietary scale for the pregnant and nursing woman.

At the request of several of the obstetricians of Brisbane, my colleague on the Nutrition Research Committee of the Queensland Branch, Dr. N. M. Gutteridge, prepared a statement entitled "Adequate Nutrition during Pregnancy and Nursing" for the purpose of distribution by the doctor among his maternity and nursing patients. At my request,

he has kindly allowed me to have a supply of these statements, and they are available for distribution to you tonight. (See Appendix A.)

The obstetricians must open the attack on the evil of dental decay. On them rests the first responsibility of seeing that the baby, when it arrives, is provided with good sound teeth, even though they be unerupted.

Another instance of the general influence of diet may be seen when the permanent teeth appear. How frequently one sees a poor incisor erupted, almost transparent, with thin serrated edges, an easy victim for the local activities of a defective diet.

Occasionally one is able to witness the more rapid deterioration of the organs of mastication in a patient on whom a gastrostomy has been performed. No food passes through the mouth, and hence there can be no local action of the diet. On the other hand, the meals given a gastrostomy patient consist mainly of egg and milk, and lack the necessary balance that would be provided by meat, butter, cheese, raw fruit, vegetables and potatoes. No doubt loss of the function of mastication also plays its part in these cases, the jaws lacking the increased supply of blood which mastication brings about.

Dietary deficiency, of course, may occur at any age,⁽¹⁶⁾ and it has been stated that it is just as essential for us at sixty years of age to consume one gramme of calcium and one gramme of phosphorus each day, with enough vitamin D, as it was at six.

As I have pointed out before, in considering a normal diet the optimum requirements should be considered. These should be based on the physiological ideal, that is, such a state of well-being that no improvement can be effected by a change in diet. The standard of adequacy in diet is one that will maintain perfect nutrition. The diet must be properly balanced, so that in addition to having a sufficient supply of calories, there will be a preference for foods with a higher biological value and also for those containing a sufficiency of vitamins and of mineral salts.

Today dental decay, anaemia, rickets and tuberculosis⁽¹¹⁾ are looked upon as *indicia* of malnutrition. Up to a few years ago the approach to the problem of nutrition was from the standpoint of analysis. Each food constituent was taken separately and the effect of the withdrawal of each was noted in laboratory animals and man. Today, however, we have arrived at the synthetic phase of nutritional knowledge,⁽⁹⁾ and it is usual to regard the subject from a broad standpoint; nutrition is taken as a whole. The interrelationship of the various factors is so intimate that it is only by finding out the minimum requirements of each, and associating them in an ideal diet and then comparing an imperfect diet with this ideal diet, that the bearing of adequate nutrition on many of our modern ills can be appreciated.

The recent remarkable report of Sir John Orr⁽¹¹⁾ on the nutrition of the people of Great Britain has shown that, taking the calorie as a basis of food value, only about 10% of the people of Great Britain are having an inadequate diet. On the other hand, if the calcium, phosphorus and vitamins A, B and C requirements of adequacy are taken, it will be seen that 50% of the people of Great Britain are underfed. (See Figures II and III.)

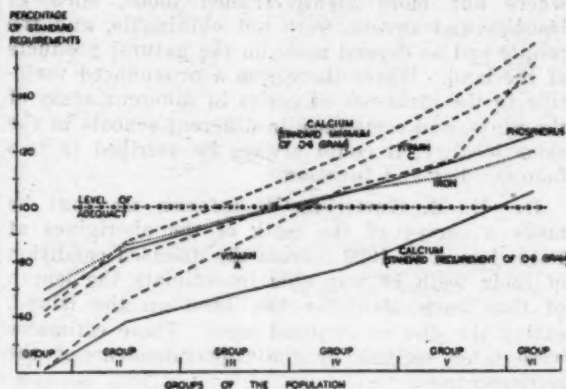


FIGURE II.
Average intake of minerals and vitamins, expressed as percentage of standard requirements.

In Figures II and III the groups (horizontal line) are graded according to the wealth of the people, the poorest being in Group I and the wealthiest in Group VI. The first and sixth groups each represent 10% of the population, whereas each of the intervening groups represents 20%. The upright line represents percentage of adequacy. The level of adequacy regarding any foodstuff is represented by 100. Thus, in the case of calcium, 100 represents 0.9 gramme, and in the case of calories, 2,810.

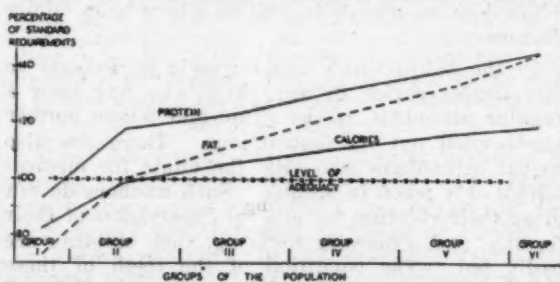


FIGURE III.
Average intake of calories, protein and fat, expressed as percentage of standard requirements.

Strange to say, the average nutrition of the people of this country is lower than that in Great Britain, and, incidentally, so is the dental health.

As regards the foundation foods, we eat more meat, but we consume less milk, cheese, fruit, potatoes and other vegetables. If butter and butter substitutes are grouped together, we eat less of these than the people of the British Isles do. We eat only half the potatoes, the Britishers eating

210 pounds per year, compared with our 122 pounds. The average Englishman spends ninepence a week on fruit, while the average Australian spends three and a half pence. In the matter of vegetables, other than potatoes, the Englishman spends four a half pence a week, whereas the Australian only spends one and a half pence a week. Regarding fruit, one has to make an allowance for the difference in price between Great Britain and Australia, but, even making this allowance, there is a big discrepancy.

On the other hand, our consumption of supplementary foods, such as flour, bread and sugar, is above that of Great Britain, and, what is more, the foods that we eat to excess, such as meat, flour and bread, have an acid ash. If we eat more meat, we should certainly eat more of the foods giving an alkaline ash, such as vegetables, fruit, milk and butter (neutral).

The diet that is recommended for the nursing mother is equally suitable for the rest of mankind, but it is especially important that the diet should be adequate during periods of great strain. A diet which may keep in fair health an adult living an unexacting life, will fail to satisfy fully the needs of a growing child, and will be insufficient for times of stress such as occur in pregnancy, lactation and illness.

The general influence of a properly balanced diet may also be seen in the rate of growth of children.⁽¹¹⁾ It is well known that stature is largely determined by heredity. The extent to which a child will attain the limit set by heredity is, however, affected by diet. Certain deficiencies of the diet lead to a diminution in the rate of growth, with the result that the adult does not attain the full stature made possible by his inherited capacity for growth. Height and weight of children are therefore sometimes taken as an indication of the state of nutrition. On account of hereditary factors, figures applying to small groups are of little value. In large groups of the same race, however, comparable figures for height and weight do give an indication of the relative adequacy of the diets of the groups.

Figure IV is a graph giving the heights at different ages of children attending various schools in England. Those attending the public schools (corresponding to our large secondary schools) have a diet more nearly approaching the ideal, whereas boys attending council schools (corresponding largely to our State primary schools) have a diet that departs most from the ideal. It is seen that the boys with best diets are several inches taller than those on the more defective diets.

The Local Influence of Diet.

It is thus seen that the general influence of diet on dental health is a most important one. There is also the local action of the diet on the teeth due to the influence of unsuitable food. Strong teeth are only a passive form of defence against disease. The best teeth may decay, but poor teeth need not develop

dental caries. Dental decay is due to the erosion of the enamel by acids formed by carbohydrate fermentation.

It is logical to assume that Nature must have made some provision for the preservation of the teeth against dental caries, and this she has certainly done. The salivary glands are the preservative glands of the teeth. The saliva is a fluid varying in alkalinity and in quantity. Generally speaking, two to three pints of saliva are poured into the mouth in every twenty-four hours. Food entering the mouth sets up a reflex, stimulating the salivary glands to action. Different foods produce different responses. By combining the

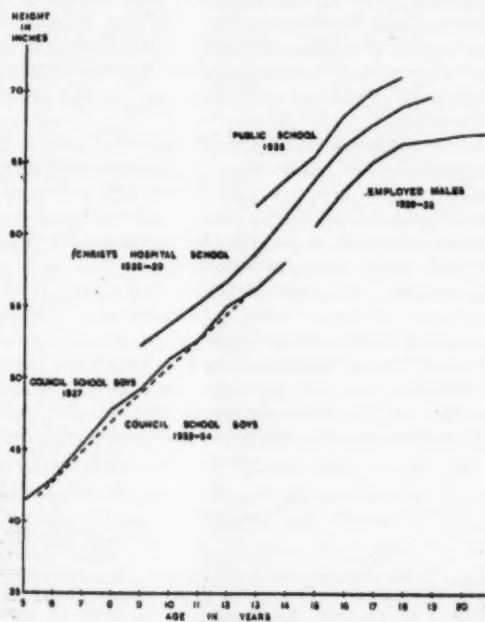


FIGURE IV.
Heights of males by social groups, compiled from various sources, 1926-1935.

figures representing the quantity and the alkalinity of saliva, one is able to estimate the alkalinity per minute of the saliva in its response to different foods.

Table II is a scale⁽¹⁷⁾ representing the alkalinity per minute after taking various foods:

TABLE II.

Substances Masticated or Used as Stimulant.	Alkalinity per Minute.
Normal resting saliva	1.73
Bread and butter (soft)	1.28
Dry bread	2.84
Cake	2.80
Stewed apple	13.64
Raw apple	14.38
Orange	15.00

Most foods increase the flow and alkalinity of the saliva, but foods with an acid flavour, such as fruits, do so much more markedly. The highest

figures were obtained with oranges and apples; white bread and butter actually decreased both.

The response of the salivary glands is not only sufficient to neutralize the acids in the mouth, but it also continues to have a neutralizing and cleansing effect on the mouth for some time afterwards. There is no such thing as an acid mouth, as any free acid in the mouth would be speedily neutralized. This cleansing and neutralizing action of the saliva is its main function, for it has little influence on the process of digestion.

As I have said before, dental decay is due to the erosion of the enamel by acids formed by carbohydrate fermentation. Pasty collections of starchy food accumulate in the cusps of the teeth, or fill the interstices between them. These pastes are formed with the help of mucin, which makes the pastes adhere more readily to the teeth. The acid thus formed combines with the lime in the enamel and erodes it.

The consumption of large amounts of sugar has a marked effect in increasing the quantity of mucin formed by the mucous membrane of the mouth. The combination of sugar and mucin is even more harmful in binding to the teeth material which later undergoes acid fermentation.

The saliva contains a ferment called ptyalin, which also plays a part in dissolving adherent starchy material. Experimentally, biscuit caused only a moderate increase in the quantity of ptyalin secreted each minute, but this was increased eight times by adding fruit acids to the biscuit. One can therefore easily understand the harmful action of biscuits, chocolate *et cetera* on the teeth.

After investigating the action of the saliva, Pickerill⁽¹⁷⁾ states his conclusions as follows:

1. It is evident that the saliva is a fluid extremely variable in its composition and amount, but these variations do not occur without reason, but rather in obedience to fixed and definite laws and in response to certain ascertainable stimuli.

2. The mechanism controlling salivary secretion is extremely sensitive and complex, since different "flavours" of little intensity are capable of being "selected" and give rise to secretions of saliva differing widely in character and amount.

3. That practically all the normal constituents of saliva are, if present in sufficient amount, of value and importance in protecting the teeth against the occurrence of dental caries and in maintaining the health of the oral mucous membrane.

4. That acids, and especially the natural organic acids, are the substances that excite the greatest amount of these protective substances per minute and moreover give rise immediately and for a considerable time afterwards to an increased alkalinity of the mouth. That, conversely, substances of little or no distinctive flavour and also alkalis produce a diminution in the amount of protective substances per minute and reduce the alkalinity of the mouth both at once and for some time afterwards.

Turner⁽⁴⁾ points out that this statement is not quite accurately worded. The first and transient effect of alkalis is, of course, to increase the alkalinity of the mouth; their secondary and predominant effect is to decrease the alkaline flow in the mouth.

Pickerill also states:

5. That in the saliva is provided a natural and potentially perfect mouth-wash acting continuously day and night (not merely for a few minutes a day). That it is, moreover, completely under control; that it may be altered and varied in amount or composition; that its beneficial effects may be increased or decreased absolutely at will.

In the past, the Maori diet⁽¹⁷⁾ consisted mainly of carbohydrates, though birds, fish, shell fish *et cetera* were also eaten. The staple food was the sweet potato. The Maoris also ate the taro and the starch of fern roots, from which all vegetable fibres were carefully removed, a soft dough, which was cooked, being left. These carbohydrate foods were flavoured with acid vegetable juices.

Pickerill⁽¹⁷⁾ stated that the Maoris of old had only two meals a day, and the incidence of dental disease was only 1%. On the other hand, 95% of Maori children today, living under European conditions, suffer from dental caries.

Turner⁽⁴⁾ has remarked that it would almost seem that we feed our children expressly with the object of destroying their teeth. Instead of giving them hard baked bread, we give them soft bread and butter, a tasteless food that requires scarcely any mastication. We supplement this with carbohydrate slops and biscuits made with finely ground flour. Not content with three meals a day, many mothers give biscuits and pieces of bread and butter between meals at irregular intervals, so that the teeth are never free from their *débris*. The acid drinks which all children like are seldom given at meals. Instead, many young children are given tea, the tannin of which is a powerful salivary depressant. We do not give them fruit as a regular article of diet at meal times, and especially at the end of each meal. We treat it as a luxury, giving it between meals, when it is least useful, or at irregular intervals, and often in excessive amounts. To make things certain, instead of giving them pieces of sugar cane, which would do them good, we give them large quantities of concentrated sugar in the form chiefly of soft sweets, which excite the secretion of mucin and coat their teeth with a glutinous corrosive film.

We must therefore correct these errors if we are to preserve the teeth. The toothbrush has only a subsidiary value; native races and our forefathers, who had good teeth, did not use it. Its only use is to remove the food *débris* and pastes that cling about our teeth. Most children who brush their teeth do so after their bath, before breakfast. If the teeth are brushed only once a day, then the proper time is before retiring. Dentifrices have merely a cosmetic value. They are best not used at all. No antiseptics will make the mouth aseptic or diminish the number of germs in it for more than a short period. They all diminish the salivary secretion and thus favour the growth of micro-organisms. Alkalis do the same. They make the mouth more alkaline for a short time at the expense of a continuous alkaline flow. On the other hand, a dilute solution of acid tartrate of potash,

sweetened with saccharin, is both pleasant and beneficial. To quote Turner⁽⁴⁾ again: "Those who wish to assist Nature should study her methods and work with her, not against her."

The Influence of Function.

Lastly, we come to the influence of function on dental disease.

To begin, every baby should be breast-fed. The only contraindications to breast feeding apply to the mother, and they are few. The breast-fed baby has strong, sound, well-built jaws and teeth. The breast, in the action of sucking, is flattened out between the baby's jaws and causes a constant massage of the gums. Sucking is hard work and brings an ample flow of blood to the baby's mouth, nose and throat. A bottle-fed baby lacks the hard work and the resulting full supply of blood for the mouth, nose and throat which is essential for building strong, resistive tissues. Also, if a baby is not breast-fed there is a risk not only of its getting insufficient vitamins, but in addition of innutrition, the result of unsuitable feeding and alimentary disturbances. These may leave permanent damage to the teeth, just as any long or severe illness does.

Another result of lack of function is underdevelopment of the jaws, which in turn leads to overcrowding, a further cause of defective teeth.

The jaws of the six-year-old child have to accommodate 52 teeth, 20 temporary and 32 permanent teeth. The permanent teeth lie in the jaw bones between the roots of the temporary teeth, as can be readily demonstrated by an X ray photograph, and there is no spare room. Quite often the jaw is small, narrow or underdeveloped, so that there is not sufficient room for the permanent teeth. The result is that the permanent teeth are poorly developed or overcrowded. They may even be forced out of position or overlap.

Like other bones in the body, the jaw bones develop according to the stresses and strains caused by muscular action. Unfortunately, after a child is weaned, it is almost entirely pap-fed, instead of being given hard food, such as baked bread, raw apple, *et cetera*. What solid food it does get is generally tough and not hard, and consists of such things as crusts of bread and pieces of meat. Tough food requires chewing by lateral movements of the jaws; this exercises the internal pterygoids, which narrow the jaws and not the strong biting muscles, such as the masseters and temporals, which broaden them.

When the child is a little older, it has probably developed dental caries, which makes its mouth too tender for it to bite, so that it cannot take hard food. There is also a tendency to lose the decayed teeth prematurely, and so the remaining teeth tend to become approximated. Here, then, is another serious cause of non-expansion of the jaws and damage to the permanent teeth.

Just as the child is pap-fed, so, on the whole, is the adult. We avoid tough, hard foods and prefer the softer, sloppy ones. Today the greater part of

the work of mastication is done outside the body by the knife and fork, the mincing machine, the oven and the mills of industry.

There is not an organ in the body that will not degenerate and finally atrophy if it is not used. The teeth need the hard work of biting and chewing in order to maintain a good blood supply. No one would suggest that one could develop powerful muscles merely by taking a satisfactory diet. To develop strong muscles, we must exercise them. The same applies with equal force to the teeth. For want of biting, we develop teeth that will not bite.

I again refer to the gastrostomy patient. I said previously that the general effect of the diet was a factor in the deterioration of his teeth; so is lack of function. Dr. Nye,⁽⁶⁶⁾ in a recent address, also referred to the gastrostomy patient. He thought that lack of function played the greatest part. As no food entered the mouth, there was no chewing, and as a result the dental health of the patient deteriorated. In the past the local action of the diet was the only influence considered in relation to dental disease. The gastrostomy patient, however, develops dental disease not from the local action of diet, for there is none. It must be either the general action of the diet, lack of function, or both.

Dr. Nye has suggested the use of a tough chewing gum. It should be sweetened with saccharin and have a mild acid flavour. If such a gum can be made, it will afford the confectioner an opportunity for doing good instead of harm to the health of the community.

Summary.

I think you will agree that I have demonstrated that dental decay is dietetic in origin and that the condition of the teeth is a sensitive index of malnutrition.

I have also endeavoured to describe the three ways in which a defective diet may cause dental disease. Furthermore, I have suggested an adequate diet, which, if adopted, will lead to an improvement in the general health of the community, and this will first be seen in the teeth.

These expectations are no longer matters of speculation, but of fact, and have been borne out by various experiments in different parts of the world. I shall record the latest that has come to hand.

Quite recently, Collett, of Oslo,⁽¹⁸⁾ published the result of an interesting experiment. Under his care were the children of two institutions. The first was a closed institution at which the children boarded in, the second a nursery school where the children attended from 8.30 a.m. to 4 p.m. daily. At the latter the children's teeth were brushed at the school and they received one-third of a litre of milk (that is, just under half a pint) and a hot meal. At home they were given sweets and soft bread, as well as fruit, vegetables, meat and fish, and the state of their teeth was deplorable. Among 40 children between the ages of three and seven years there were 584 cavities in the teeth, that is,

14.6 cavities per child. (Every ruined or extracted tooth counted as two cavities. The 42 teeth thus classified accounted accordingly for 84 out of the 584 cavities.)

Very different was the oral condition of the 11 children of similar age in the first school, that is, the closed school. These children had 209 milk teeth and 14 permanent teeth; and only 19 cavities, 16 of which were already filled, could be found. These 19 cavities were distributed among 11 teeth, and no fewer than 9 of the 19 belonged to the same child, who had been admitted to the institution at a comparatively late age. All the 19 cavities were in the milk teeth.

Thus, whereas the children of the first institution had only 1.7 cavities per child, only 4.9% of the teeth being decayed, in the second institution there were 14.6 cavities per child. Furthermore, the size of the cavities in the first institution was minute, while in the second institution the cavities were painfully obvious.

Dr. Collett considers that the difference was mainly due to the diet. In the first institution, with the low incidence of dental caries, the children had hardly any sweets, over half a litre of milk, home-baked bread containing 50% whole meal, a dessertspoonful of cod liver oil every day throughout the year, and plenty of vegetables and some fruit. Every meal ended with uncooked fruit or carrots. The toothbrush and local dental hygiene, apart from the filling of the cavities, were dispensed with.

Conclusion.

In concluding this survey of the recent developments of dental decay as an index of malnutrition, let us sound a note of optimism.

Today we have available knowledge and research experience to make it possible to remove this blight of dental disease from our civilization.

In the past the food habits of the people were based on fashion and custom. Today they still are, but people are prepared for scientific guidance. Therefore, as members of our professions, who have as our responsibility the health of the people whom we serve, let us be in the vanguard of the attack on preventable ill-health.

Acknowledgement.

I wish here to express my gratitude to Dr. N. M. Gutteridge for his valuable help in the preparation of this address.

Appendix.

Adequate Nutrition During Pregnancy and Nursing.

In the interests of your own health, and particularly in the interest of the health of your baby, it is most important that your nutrition should be as efficient as possible. It is well to remember that the foundations of your baby's teeth, for instance, are laid down long before it is born, and nothing that could be done in the baby's later years can make up for the improper tooth foundations formed during the period of pregnancy.

Quite recently medical science has made a definite announcement as to the food that should be eaten during pregnancy in order to insure a properly nourished body. This announcement was made by a committee of nutrition

experts called together from all over the world by the League of Nations. Their dietary schedule is a properly balanced assortment of the various food elements and contains ample quantities of vitamins and mineral salts. It is not necessary for you to take any other concentrated vitamin preparation.

Your daily diet should include:

Milk, one and a half to two pints.

Meat, including fish, poultry, liver and kidney, four ounces.

One egg.

One ounce of cheese.

Three ounces of lettuce (raw) or cabbage (cooked).

Half a pound of potatoes.

Two ounces of butter.

Four pieces of fresh raw fruit daily.

A serving of two of the following vegetables: Beans, peas, tomatoes, carrots or cauliflower.

It is better if your sugar and white flour products, such as confectionery, white bread, scones, cakes, pastry and "boiled pudding" are reduced. Egg custards, junket and fruit salad make the best desserts.

As a supplementary food, eat wholemeal or cerevite bread. As a breakfast dish, use cerevite breakfast meal; your chemist can get it for you. Buy good quality meat. The cheaper meats are not nearly so nutritious.

Spend an hour or two every day in the fresh air and sunshine. This is important to keep you well. Eat your lettuce as salad. Combine with it raw tomatoes, shredded raw carrot and a sliced boiled egg.

As regards wholemeal bread, the best quality is made from stone-ground flour and is of quite a light brown colour. The darker breads are usually artificially coloured and are not as valuable to your nutrition as the more lightly coloured types. If you wish, I can give you the names of those bakers who have made a special effort to produce a nutritious and highly palatable wholemeal loaf.

As well as being good for you, these foods are the best for your husband and family too. You will find that you will feel well and keep more healthy if the general principles of this dietary schedule are followed.

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ILLUSTRATIONS TO THE ARTICLE BY DR. GARNET HALLORAN.



FIGURE I.

Case I. Rounded mass in the upper lobe of the right lung. The lower margins are smooth and slightly lobulated; the upper margins show definite infiltration of the adjacent lung. Appearance suggests primary carcinoma. No evidence of metastases. *Post mortem* examination revealed carcinoma.



FIGURE II.

Case II. Large mass at the right base with rounded upper margins. Some thickening of the overlying pleura and a small collection of fluid. Heart not displaced. Appearance suggests large neoplasm, probably carcinoma. Bronchoscopy revealed vascular neoplasm of the right lower lobe bronchus.

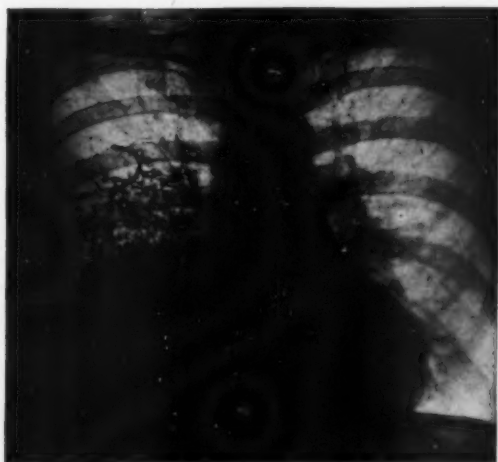


FIGURE III.

Consolidation just below the right hilum, probably with some atelectasis of the lung medially and slight emphysema in the right costo-phrenic angle. Bronchoscopy (biopsy) revealed carcinoma of the right main bronchus.

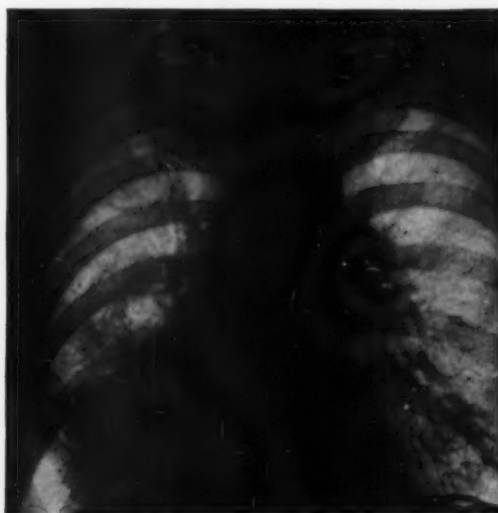
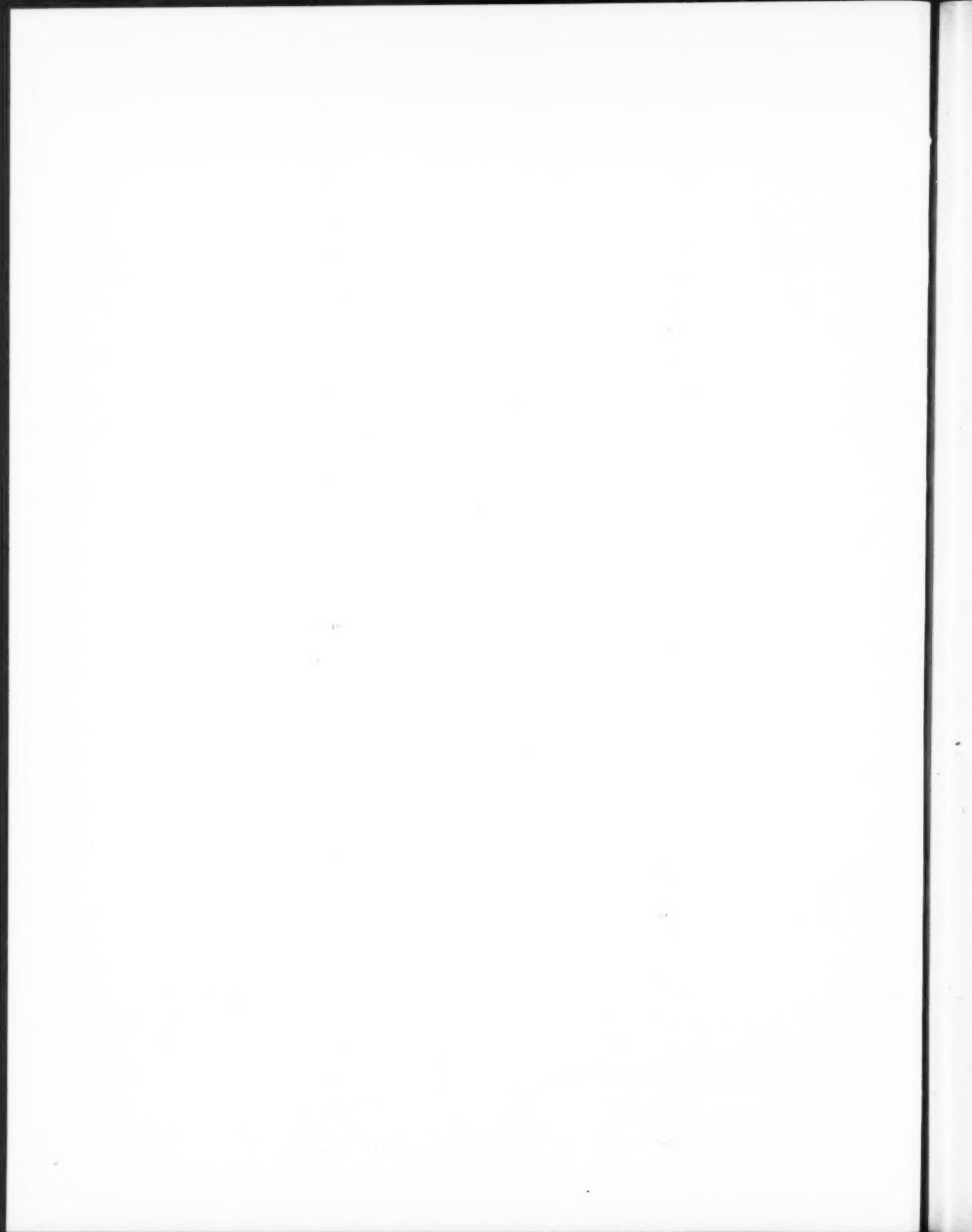


FIGURE IV.

Same case as Figure III. Lipiodol injection shows obstruction of the lower right bronchus with atelectasis distal to this. A small collection of fluid has developed at the base.



THE DENTAL CONCEPT OF ORAL INFECTION.¹

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WHILE I recognize the fact that I am not known to you as a deeply religious man, yet I feel that I cannot do better than quote at the outset from the third chapter of Exodus: "Put off thy shoes from off thy feet, for the place whereon thou standest is holy ground." It is a matter of very grave concern that this "holy ground", instead of being a kind of "no-man's land", is not more thoroughly understood and trodden upon with greater reverence by both the medical and dental professions.

It is, unfortunately, a fact that the knowledge necessary for the successful practice of both our professions is reaching greater proportions day by day, and that the man who would be up to date and who would practise his profession conscientiously and well must sacrifice a considerable amount of what should be his spare time.

It is obvious that neither profession can know all about the other. The man who takes a combined course of medicine and dentistry is frequently not outstanding in either, and those countries which demand medicine as a prerequisite to dentistry are not on that account any better off.

The moral is obvious: the one should be the complement to the other, and the best interests of the patient will be served by proper cooperation between the two professions. I could say a good deal on this subject, but shall merely observe *en passant* that the man who thinks he knows a lot about the other fellow's field is generally the one who knows least. It cuts both ways.

Of necessity I must be brief in many of the phases of such a wide subject as oral infection, so I shall crave your indulgence if I appear fragmentary and only "hit the high spots".

In dealing with the early life of the individual many grave problems present themselves, and not the least important is the maintenance of a healthy oral cavity with efficient mastication.

Unfortunately, parents do not fully realize their responsibility in caring for the child's teeth, either by their own efforts at cleanliness or by regular dental examination. If they could only realize how necessary it is to have the utmost efficiency in mastication during the period of growth, possibly even more than after growth is completed, many troubles could be avoided.

The exposed pulp in the deciduous tooth is, to my mind, of equal or greater significance to us than that of the permanent tooth.

We are indeed on the horns of a dilemma: to extract the tooth means to cripple the child's masticating efficiency, with its consequent systematic

effect; moreover, it generally results in malocclusion of the permanent dentition, which in its turn predisposes towards caries and periodontal disease in adult life. On the other hand, root treatment may result in establishing a focus of infection which is equally undesirable.

I feel sure, however, that pulpectomy of the bulbous portion of a freshly exposed pulp in a deciduous molar is a justifiable procedure, especially in a well-cared-for and otherwise unutilized mouth. I have carried out many such treatments and the results have been apparently successful, the teeth having been ultimately shed by the normal physiological resorption of their roots.

The diagnosis of dental disease as a causative factor in systemic complaints often calls for very many niceties of judgement. It is very easy to say: "Get all your teeth out", and when the patient has had this done and a considerable improvement takes place, you pat yourself on the back and say: "What a good fellow am I!" But are you the good fellow that you thought you were? Is the patient losing twenty or thirty teeth unnecessarily, when perhaps a more thorough diagnosis would have narrowed the loss down to one or two? These are questions which every medical and dental practitioner should ask himself before proceeding with the "Roman holiday".

Broadly speaking, we may divide our patients into two groups: (i) those in good health, (ii) those who are not. In the first group we can carry out various treatments and procedures which would be more or less impossible in the second group. This, of course, opens up a very big question, namely, that of the pulpless tooth. I think that 80% of the pulpless teeth which have in the past fallen before the forceps should never have been treated in the first place, as they were hopelessly diseased from the start.

It is this lack of judgement which has brought every pulpless tooth under grave suspicion; so much so that they are frequently spoken of as "dead teeth"; but are they really dead? So far as enamel and dentine are concerned, yes; but what about the cementum? This is apparently still capable of further change and growth. It is my firm belief that in time the problem of the pulpless tooth will be solved to the satisfaction of both our professions. In the meantime, the removal of a freshly exposed pulp in a healthy individual, carried out under proper aseptic conditions, in an operation from which one may expect as high a degree of success as is obtainable from many other operations, such as "the Caldwell-Luc", to quote only one.

In patients of the second group an entirely different state of affairs exists. Here we cannot afford to take chances. The health is in some way threatened and no stone must be left unturned to remove possible foci of infection. The use of full mouth X ray examinations is, of course, indispensable. Alveolar ridges which appear otherwise healthy often harbour residual infection, cysts,

¹Read at a meeting of the Queensland Branch of the British Medical Association and the Queensland Branch of the Australian Dental Association on May 1, 1936.

impacted teeth root fragments *et cetera*, so that even the edentulous mouth should be so treated.

The radiograph, however, is not the be all and end all of the diagnosis; the clinical signs and symptoms should be studied in conjunction before a decision is reached. It is wise to remember that the radiographically normal tooth is frequently infected by bacteria. This brings us to a consideration of where to look for possible sources of infection. Of course, apical infection and gingival infection are the most common, but there are others as well. The vital pulp can be infected and may even be a greater offender than either of the previous two.

Rickert writes:

When teeth having an infected degenerating vital pulp are definitely located and treated, the immediate response and the phenomenal relief from the acute secondary effects are frequently more definite than those following the elimination of pulpless teeth In the most striking cases of elective localization that we have seen the cultures were from infected vital pulps.

To go into detail with respect to alveolo-dental radiology is unfortunately beyond the scope of a paper; it requires a whole book; but one or two points may be mentioned.

The gross changes in structure are usually very obvious and well known to everyone, so I shall omit mention of them. The changes which take place in the periodental membrane, as seen in the radiograph, afford many clues to possible infection.

The thin unbroken line completely surrounding the root is generally agreed to be ideal. A break in the line or a thickening near the apex is suspicious, particularly in skiagrams of the lower jaw when the rays are projected at right angles to the film.

In the upper jaw distortion due to the angle of the beam may take place and may confuse the diagnosis. A progressive thickening taking place towards the crown of the tooth is generally indicative of periodontal disease.

In discussing the lamella, Pollia writes:

The periodental lamella is a fine, even, white line when looked at in the radiograph. It is the direct antithesis of the membrane. Like the membrane, it is fine and even. It has a characteristic of its own, namely, that it hugs the tooth, follows every peculiarity of its form, and is always the same distance away from the tooth root The lamella can be said to have a "tailored fit" to the root. This is very important, because when the lamella seems to separate itself at any point from the root, that means that a pathological process is going on within the membrane, which is causing an increase in the thickness of the structure at the affected point, which results in the apparent pushing away of the lamella directly opposite the lesion.

A particular search should be made for changes in density of the alveolar process itself; these are usually indicative of the various atrophies and hyperplasias, and their proximity or otherwise to the lamella may be a deciding factor in determining their infectivity. The size of the cancellations,

when they reach unusual proportions so that they almost resemble multilocular cysts, is stated to have a direct bearing on parathyreoid influence; if this is so, it is a point worth bearing in mind.

Clinical Observations.

At the very outset, in dealing with clinical observations, I should like to condemn diagnosis by "clairvoyancy". I am using the term "clairvoyancy" because I can think of no other means by which some people make a diagnosis. The procedure is somewhat as follows: "Open your mouth." "Yes, I don't like the look of that tooth and that one; get them out, they are the cause of your trouble." You know as well as I do that this is not diagnosis; it is just humbug.

Possibly a good many of us who spend our whole lives dealing with one small part of the body are a trifle dull, and that may be why it takes the best of us quite a time to give a considered opinion. The determination of the ravages of periodontal disease involves an extensive examination with an explorer to determine the depth of pockets. A visual examination is the most misleading thing of which I know. In the dirtiest looking cases shallow pockets are often present and are easily cleared up; in some of the cleanest, on the other hand, pockets often extend almost to the apex, and these are generally incurable.

Incidentally, I consider that the use of the word "pyorrhœa" (how I hate it) is the cause of much misunderstanding and is responsible for many patients' living in a fool's paradise because they have been told that they have no pyorrhœa, but only gingivitis.

I should like to say now that it would be much better if we drew a sharp line of demarcation and said that the gums were either normal or not normal. If they are not normal, then the patient may slowly but surely be treading the path which leads to the ultimate loss of the teeth by periodontal disease. There are many varieties of such pathways, but the end result or late manifestation is the same, namely, the presence of pus with loosening of the teeth. Ah, yes, when there is plenty of pus, then you can say to the patient: "Now you have pyorrhœa." Surely the right time to treat any disease is when the earliest signs are present, and the right time to treat the gums is the moment when they are no longer normal.

In making a casual examination of a mouth it is frequently a common mistake to condemn a "pivot" just because it is a pivot. This may be a good sporting bet, but it is not definite proof. A properly fitted pivot should be no worse than any other pulpless tooth, and it may even be better, the less conspicuous multi-rooted pulpless tooth being possibly more infected, owing to greater difficulty in treatment.

Since the scathing indictment made by Hunter at McGill University some twenty-five years ago, the dental profession, to use another biblical phrase, "has girded up its loins". The crown and

bridge work practised then and to a certain extent since suffered from several disadvantages, chiefly (i) wrong diagnosis, (ii) devitalization of teeth, (iii) unhygienic pontics or "dummy" teeth.

Modern crown and bridge work has answered the challenge by using only vital abutments, which, thanks to the casting method, can also avoid gingival irritation; and, secondly, the improved design in pontics—notably the porcelain-tipped pontic—enables thorough cleanliness to be maintained.

There is still much of common interest that can be discussed, but I have endeavoured in the short space of time available to touch on the more contentious questions. The pathology of the soft tissues of the oral cavity might be better understood by both professions, but this will, I feel sure, come about in the future.

As is fairly well known, the syndrome of fatigue and myositis, in common with other symptoms, is generally an indication of a focal infection and may in many cases point the way to dental sepsis as a causative factor. It is then that the medical practitioner requires an accurate diagnosis, and it is the duty of the dentist to see that he is armed with sufficient knowledge to give an opinion.

Obscure pains, headaches and various neuroses may often be a sign of nerve pressure, such as emanates from an impacted tooth, which, if discovered, should of course be removed. In fact,⁽³⁾ "practically all impacted teeth which have partly erupted or have a communicating sinus should be removed. The space surrounding the crown, under these circumstances, forms an ideal place for micro-organisms to flourish, with possibilities of a sudden acute infection."

Before concluding, I should like to repeat that there are many phases of our daily work in addition to those mentioned in which we can be of mutual assistance, such as in sinus complications, cysts, tumours, cleft palates and fractures. Moreover, the opinion of a physician must be sought by a dentist for a general diagnosis just as much as the dental diagnosis must be sought by a physician.

To my medical friends I should like to give a friendly tip, if I may do so. Be careful of the dental opinion you express; remember that your patient is ill and wishes to get better and will often value your opinion before that of a dentist; so please be sure that it is the right one. To my dental colleagues I would say: Think in terms of health and see to it that your medical friend can place the utmost reliance on any opinion expressed by you.

If these few scattered remarks can do anything towards a better understanding between our two professions, then your time will not have been wasted nor your patience exhausted in vain.

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PRELIMINARY TREATMENT IN RELATION TO THE THERAPEUTIC IRRADIATION OF MOUSE TUMOURS.¹

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PART II.

PREVIOUS attempts to sensitize a tumour *in vivo* to X radiation comprise tuberculin and potassium iodide injection and heating of the tumour region by means of a diathermy current.⁽¹⁾ Attention was then directed to the possibility of employing for this purpose metabolic inhibitors, potassium cyanide and sodium iodo-acetate.⁽²⁾

The present work was commenced in order to explore the possibility of utilizing as an X ray activator hypericin, the active principle of the poisonous weed *Hypericum perforatum*. It is known that hypericin may sensitize animals to light in such a manner that severe skin rashes occur on exposure to sunlight.⁽³⁾ This apparent photochemical action might be available in the depths of a tissue on exposure to X radiation.

Extraction.

A supply of fresh weed, *Hypericum perforatum*, was obtained and about two pounds were thoroughly bruised in an iron motor, after which the weed was extracted with boiling methyl alcohol for about six hours. The resulting red solution was purified according to a method described by Horsley.⁽³⁾ Briefly, distilled water was added to give successive dilutions, 90%, 70%, 50% and 15%, and the product was filtered at each stage, a process which removes most of the chlorophyll present. The concentration was then increased about threefold by distillation *in vacuo*, since the higher temperature necessary at air pressure appeared to give rise to a gummy deposit. The concentrate was then washed twice with about one-third of its volume of chloroform, and the red pigment was then extracted with ethyl acetate. This extract consisted of clear solution of an intense red colour, and it was further concentrated to about half volume for storage. A spectroscopic examination showed bands at 5,460 and 5,880 Ångström units, but there was no trace of the chlorophyll bands.

Skin Reactions.

One cubic centimetre of the above hypericin solution was evaporated to dryness and dissolved for injection in 0.5 cubic centimetre of 1% sodium bicarbonate solution. This procedure probably results in the loss of some active material. A series of white mice, of an average weight of twenty-five grammes, received this solution in the tail veins and the lethal dose was found to be about 0.5 cubic centimetre. This dose represents about ten milli-

¹ This work was carried out under the control of the Cancer Research Committee of the University of Sydney and with the aid of the Cancer Research and Treatment Fund.

grammes of the solid plant extract, but it is not possible to say what proportion is active pigment and what is impurity. Some of the mice died in a few minutes, whilst others died after several hours with severe jaundice, indicating a toxic action probably on the liver.

The results of some preliminary experiments on skin effects are given in Table I, where O represents no change, whilst + represents a slight reaction, ++ a moderate reaction, and +++ severe ulceration; D indicates death from the treatment.

TABLE I.
Skin Reactions.

	Dose of Solution. (Cubic Centimetres.)	Control.	Hypericin.	Remarks.
A. Sunlight.	0.2	—	++	
	0.3	—	D	
	0.3	+	+++	Shaved.
	0.2	0	++	Shaved.
B. X rays.	0.2	0	0	Hard X rays.
	0.4	0	Roughened hair	Hard X rays.
	0.4	+	+	Soft X rays.
	0.4	+	D	Soft X rays.
	0.2	D	D (no hair growth)	Soft X rays: shaved.
	0.2	D	+	Soft X rays: shaved.
	0.2	D	+	Soft X rays: shaved.
	0.2	+++	+++	Soft X rays: shaved.
C. Sunlight.	0.2	+	+++	Shaved.
	0.2	0	++	Shaved.

0 = no reaction; + = slight reaction; ++ = moderate reaction; +++ = severe reaction; D = death from treatment.

The activity of the preparation was first tested by means of exposures to sunlight (Table Ia), and after two preliminary trials it was decided to employ controls. The optimum exposure period appeared to be about one hour, and an area on the back of each mouse was shaved to facilitate observation. The two mice were then sitted to a frame to prevent movement whilst one square centimetre of the shaved area was exposed to direct sunlight. It will be seen from the table that one slight reaction was recorded in a control, but the injected specimens were distinct and the exposed area became covered with a dark brown scab in the course of three or four days.

Table Ib is a record of attempts to increase the X ray reaction by means of hypericin injection. After some preliminary trials it was decided to continue shaving both injected and control mice, whilst one square centimetre of skin was exposed to soft unfiltered X rays (60 kilovolts) for a period of thirty minutes.

On inspecting the results (Table Ib) it will be seen that there were five deaths, presumably from an overdose of X radiation, since there was progressive wasting for about five days previously. Only one pair of mice survived long enough for a typical X ray ulcer (+++) to develop. Apart from the two remarks (see Table —) there was no indica-

tion of any sensitizing effect and the work was not continued. A brief investigation was then made of tumours which offered more promise on account of their high radio-sensitivity (see below). Finally, a few additional exposures to sunlight were made (Table Ic). This check showed that the extract retained its activity.

Experiments with Tumours.

The tumour S-37 of the Imperial Cancer Research Fund, was implanted into mice and the technical procedure was similar to that described previously.⁽¹⁾⁽²⁾ The X ray dose was approximately 530r, and one mouse treated with hypericin received 0.2 cubic centimetre of the bicarbonate solution (four milligrammes of solid extract) in the tail vein just before exposure. As previously described, physical arrangements were convenient for the simultaneous treatment of three animals, and it was decided to test whether thyroxin, a metabolic stimulant, might modify X ray sensitivity compared with a control which served for both investigations. The thyroxin was obtained from British Drug Houses Limited in ampoules containing 22 milligrammes in 2.0 cubic centimetres of saline solution for repeated administration to man. The equivalent dose for mice, weight for weight, was calculated and twenty-five times this amount, or 0.017 milligramme, was first employed as a single massive dose. This was soon increased to 0.05 milligramme, which the animals tolerated. A series of mice (injected and controls) were weighed at intervals in order to test the activity of the preparation. Unfortunately it is a tedious matter to obtain reliable results, as the weight is subject to rapid variations through the ingestion of food or loss of excreta. It appears that a single dose of the above order causes a loss of weight of only about 2% compared with a control series. Irradiation experiments were then carried out and the results are given in Table II. Thyroxin has a prolonged action which reaches a maximum only three days after injection. Accordingly it was administered three days before irradiation.

Table II is constructed in the manner previously described.⁽²⁾ The first three columns give the initial diameter in millimetres at the time of irradiation, and selections are made to give a final equal average. The next three columns give the ratio of final diameters ten days after irradiation to the initial diameter, whilst the last three columns give the final weight of the tumour after its removal by dissection.

It will be seen that there is no evidence of increased X ray action in the animals treated with hypericin. On the contrary, the tumours are slightly larger than those receiving radiation alone, but the difference is small and possibly accidental. In the case of the thyroxin-treated animals there is an indication of retarded growth by the ratio method (columns 4 and 5), but in the case of the gravimetric method (columns 7 and 8) the differences are too small to have much significance.

TABLE II.
Irradiated Tumours.

Initial Diameter. (Millimetres.)			Ratio of Final and Initial Diameters.			Final Tumour Weight. (Grammes.)		
Control.	Thyroxin.	Hypericin.	Control.	Thyroxin.	Hypericin.	Control.	Thyroxin.	Hypericin.
5.0	3.0	5.0	3.0	3.0	3.0	—	—	—
4.0	5.0	4.0	2.5	2.0	3.0	0.59	0.42	0.51
3.0	5.0	4.0	6.0	2.0	4.0	1.16	0.57	0.80
8.0	8.0	8.0	1.5	1.5	2.5	0.84	1.33	2.22
3.0	5.0	3.0	4.0	3.5	3.0	0.92	1.63	0.38
10.0	7.0	8.0	1.5	3.0	2.5	1.20	0.98	1.42
4.0	5.0	5.0	5.0	3.0	2.0	1.81	1.04	0.85
3.0	2.0	3.0	3.0	4.0	8.0	0.55	0.41	2.06
Average: 5.0	5.0	5.0	3.3	2.75	3.5	1.01	0.911	1.18

Owing to the prolonged action of thyroxin it was considered advisable to test its effect on tumour growth without irradiation. The animals recorded in Table III received 0.05 milligramme ten days before the final measurements. They were not stitched to a frame at any period, and in the absence of this trauma, and owing to the different initial sizes, they cannot be regarded as controls to Table II.

TABLE III.
Non-irradiated Tumours.

Initial Diameter. (Millimetres.)		Ratio of Final and Initial Diameters.		Final Weight. (Grammes.)	
Control.	Thyroxin.	Control.	Thyroxin.	Control.	Thyroxin.
3.0	3.0	7.0	5.0	2.4	0.7
2.0	2.0	5.5	5.0	0.8	0.4
3.0	3.0	9.0	5.0	3.7	2.1
2.5	2.0	6.0	4.0	1.2	0.9
2.0	2.0	10.0	10.0	2.4	1.8
6.0	6.0	4.0	4.0	3.9	3.9
4.0	4.0	5.0	5.0	2.6	1.9
3.0	3.0	6.0	6.0	2.1	1.2
Average: 3.2	3.1	6.5	5.8	2.4	1.6

Table III clearly demonstrates a diminished tumour growth in the animals treated with thyroxin compared with the controls. Although there were only eight pairs of experiments the lessened weight

is shown in seven cases. It appears that the small diminution which was indicated in Table II was therefore due to the direct action of the thyroxin as opposed to any increase in X ray sensitivity.

However, the prolonged action of thyroxin is much more suitable for testing the former as opposed to the latter hypothesis. Dr. Harker therefore kindly drew my attention to a powerful metabolic stimulant, dinitro-o-cresol. This compound acts rapidly, and it might be supposed to exert a maximal action if administered about half an hour before irradiation, whilst there is no confusing effect over several days as there is with thyroxin. The results are given in Table IV, and it will be seen that the "ratio" and gravimetric results are opposed. Hence dinitro-o-cresol (0.25 milligramme) produced no change comparable with the large experimental error (see below). This confirms the view that the slight effect obtained when the thyroxin-treated animals were irradiated was not due to any sensitizing effect, but to the independent action of the drug. (It was decided to carry out only six irradiation experiments and four controls in this and the following work. Small effects would be missed, but the whole object of this investigation is to find a powerful activator of X radiation, and unless there is some question of special academic importance it is only a waste of time performing a large series of experiments in the absence of an early indication of a positive result.)

TABLE IV.
Irradiated Tumours.

Initial Diameter. (Millimetres.)				Ratio of Final and Initial Diameters.				Final Weight. (Grammes.)			
Control.	Dinitro-o-cresol.	Selenium.	Bromide.	Control.	Dinitro-o-cresol.	Selenium.	Bromide.	Control.	Dinitro-o-cresol.	Selenium.	Bromide.
3.0	4.0	3.0	—	5.5	3.0	7.0	—	1.42	1.04	1.62	—
7.5	—	8.0	5.0	2.0	—	2.5	4.0	0.94	—	1.84	1.88
2.0	3.0	2.0	—	3.0	5.0	8.0	—	0.41	0.66	1.66	—
5.0	5.0	4.0	—	2.5	2.5	1.0	—	0.63	0.97	0.1	—
2.0	5.0	—	3.0	11.5	3.0	—	5.0	3.21	1.92	—	0.96
2.0	—	2.0	4.0	10.0	—	8.5	4.0	1.92	—	2.14	2.03
7.0	—	5.0	6.0	3.5	—	4.5	4.0	2.42	—	1.96	3.02
3.0	3.0	—	3.0	6.5	5.0	—	3.0	2.33	1.56	—	0.76
—	4.0	—	3.0	—	7.0	—	7.0	—	4.50	—	2.06
Average: 3.9	4.0	4.0	4.0	5.56	4.25	5.25	4.5	1.66	1.78	1.55	1.79

¹ Retrogressed, died wasting.

Todd⁽⁴⁾ has recently described favourable clinical results when a colloidal preparation of sulphur and selenium is administered forty-eight hours before irradiation. It was determined to carry out a brief test of the material in the mouse tumours in order that any results could be compared with those of other forms of treatment. The mice proved very tolerant of the preparation, and it was possible to give 0.05 cubic centimetre intravenously, although escape into the subcutaneous tissues caused sloughing. The above dose is approximately eighty times the dose calculated from the mouse:man weight ratio. It will be seen from Table V that no effect was detected within the order of accuracy of the experiment. The negative result in no way detracts from the claims made by Todd, as the recommended dose was exceeded and the preparation was administered only a short time before irradiation to facilitate selection and measurement of initial sizes. Nevertheless an impression was gained that the beneficial action of the product must be small and that research for a more powerful "activator" should be prosecuted.

Finally, some experiments are recorded in Table IV on the action of sodium bromide. This was determined after searching the literature for a substance which might fluoresce in the ultra-violet region on exposure to X radiation in the animal body. Apparently no suitable substance has been found, but Newcomer⁽⁵⁾ mentions that sodium bromide crystals fluoresce in the region of 2,000 Angström units on exposure to X radiation. This compound is relatively non-toxic and soluble in water, but fluorescence is described as "absent or very slight" in dilute aqueous solution. It was decided to give 0.2 cubic centimetre of 2.5% aqueous solution intravenously about twelve minutes before irradiation. This gives a dose, five milligrammes, which is massive (eight times) compared with a proportionate human therapeutic dosage. It is well known that the salt will be almost completely ionized, but there was just a possibility of increasing the sodium and bromine ions and perhaps obtaining sodium bromide combined with protein in a form equivalent to the solid in the cell, where a very slight ultra-violet fluorescence might have powerful effects.

However, results were negative, the small shrinkage indicated by the ratio method being balanced by an excess in the case of the gravimetric method.

Finally, in Table V is recorded a rough check of the action of hypericin, sulphur selenium colloid, and dinitro-o-cresol without irradiation. It will be seen that the control results are lowered through a tumour retrogressing. Otherwise no difference can be demonstrated for the order of accuracy of the experiment.

Table VI gives an instructive summary of present and previous results. The first experimental results obtained in this kind of work⁽¹⁾ are divided by a factor so that the non-irradiated control shall be represented by 10, whilst the irradiated control is 6.2 and the lessened growth after diathermy treatment is expressed by the value 4.6 *et cetera*. Later work is then expressed in such a way that the factor for the irradiated control is still 6.2 in order to facilitate comparison.

TABLE VI.
Comparison of the Effect of Different Forms of Treatment.

Treatment.	Moppett (36). Ratio.	Present Results.		Harker-Moppett (36).	
		Ratio.	Weight.	Ratio.	Weight.
Control non-irradiated ..	10.0	(a)	(a)	(b)	10.2
Control irradiated ..	6.2	6.2(c)	6.2(c)	6.2(c)	6.2(c)
Diathermy ..	4.6				
Tuberculin ..	5.2				
Potassium iodide ..	7(d)				
Hypericin ..		7	7		
Thyroxin ..		5	6		
Dinitro-o-cresol ..		5	7		
Sulphur selenium ..		6	6		
Sodium bromide ..		5	7		
Cyanides ..				4.6	4.3
Iodo acetate ..				4.8	5.3

(a) = Not carried out.

(b) = Unreliable.

(c) = All the results in the column are multiplied by a factor so that the "control irradiated" shall be 6.2.

(d) = The results indicated by a single digit depend on less than ten experiments.

Before considering the present results it should be noted that all the more reliable investigations (over ten experiments) indicate that the "ratio" and "gravimetric" methods give similar results. If one takes an average it will be seen that the hypericin results appear to show a slight interference with X ray action (increased growth) whilst there is an indication of diminished growth with

TABLE V.
Non-irradiated Tumours.

Initial Diameter. (Millimetres.)				Ratio of Final and Initial Diameters.				Final Weight. (Grammes.)			
Control.	Hypericin.	Selenium.	Dinitro-o-cresol.	Control.	Hypericin.	Selenium.	Dinitro-o-cresol.	Control.	Hypericin.	Selenium.	Dinitro-o-cresol.
5.0	4.0	5.0	—	4.0	7.5	5.0	—	2.12	4.69	3.07	—
1.0	2.0	3.0	—	7.5	5.0	5.0	—	0.74	0.81	1.4	—
5.0	5.0	—	4.0	4.5	4.5	—	7.5	1.82	3.33	—	5.19
6.0	5.0	—	3.0	4.0	4.0	—	6.0	2.8	1.86	—	1.04
6.0	—	6.0	8.0	1.0	—	4.5	3.0	0.08 ¹	—	2.82	2.98
1.0	—	2.0	1.0	Y	—	Y	Y	1.055	—	0.99	1.81
Average: 4.0	4.0	4.0	4.0	4.2	5.3	4.8	5.5	1.44	2.67	2.07	2.76

¹ Retrogressed. Y = unreliable owing to small initial size.

thyroxin, and in the remaining three substances the errors of the two methods cancel out or there is no apparent effect. It is thought that the use of single or double digits gives a fair idea of the accuracy of the corresponding experiment. Apparently no powerful activator has been found, but diathermy and cyanide injections have yielded the greatest effects. Tuberculin and sodium iodo-acetate show a smaller effect, but there are greater possibilities of their clinical application.

Conclusions.

1. The following substances do not show any pronounced sensitizing action when administered before X ray treatment: hypericin, thyroxin, dinitro-o-cresol, sulphur selenium colloid, sodium bromide.

2. Thyroxin appears to diminish tumour growth irrespective of radiation treatment, and this should furnish a basis for a thorough investigation of gland extracts.

Acknowledgements.

I wish to express my thanks to Professor H. Priestley, Mr. Max Henry, Mr. H. Finnemore, Professor J. C. Earl and Mr. A. W. Mackney for advice and assistance in the preparation of the hypericin solution, and to Dr. G. Harker for advice and assistance with the dinitro-o-cresol.

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Reports of Cases.

"THE SHAKY 'FLU."

By WILLIAM P. KELLY,
Brisbane.

AN epidemic disease recurs in Brisbane every few years. The symptoms resemble those described in X disease, but this is much milder and hardly ever fatal; I have seen only one death attributable thereto. The lay public, I am told, have a name for it—"the shaky 'flu". There does not appear to be a published description, and as I myself have suffered from the disease, I offer this first-hand impression, which may not be amiss.

The attack began very abruptly. In the morning I had driven down to a seaside place, feeling quite well. Returning at dusk, I began to notice a dazzlement in my vision. It had rained, so I set the sensation down to tiredness caused by moving lights reflected from the wet bitumen. My head ached slightly, but this I attributed to the close car atmosphere. Otherwise I had no difficulty in driving. On getting out of the car, I found myself unable to stand without external support. A neighbour, who perceived my predicament, helped me into the house.

I got quickly to bed. Headache was now severe, diffused over the whole skull, but most intense in the occipital region,

where it was reinforced by a feeling of tightness that seemed to arch from ear to ear.

Presently vomiting began, a bout being provoked by the smallest head movement. The act of looking upward caused the room apparently to dance and flicker, and gave intense discomfort. Transverse movement of the eyeballs produced the same kind of flickering, but no discomfort. There was never any mental dullness or any real incoordination; writing, leg or body movements could be carried out with ease and accuracy. Apart from the vomiting on movement, there was no difficulty in sitting upright. Neither did there seem to be any muscle weakness. Knee jerks and plantar reflexes were normal.

The tendency to vomit on movement disappeared in some thirty hours, but sense of balance remained doubtful. For months afterwards an unguardedly rapid turn of the head sent the universe spinning. When I looked up quickly the street appeared to dance, but this symptom did not take so long to go.

The epidemic occurs about Easter time and dies out towards the end of June. I have seen many cases; few of them were so marked or so severe as my own; some were very slight indeed. Vertigo was always present. Nystagmus was usually present during upward and horizontal movements, especially marked when the eyeballs turned beyond 45°. Temperature was moderate, but as all my cases were domestic, I had poor opportunity for obtaining complete information in this respect.

One of my patients died. He was aged about sixty, and came, walking unsteadily, into my surgery. Like all the others, he was quite clear-headed. I sent him home with a cheerful prognosis, but gradually his incapacity deepened and sphincter control was lost. He died in a public hospital, where the disease was regarded as cerebral hæmorrhage. I sent him into the hospital with a tentative diagnosis of encephalitis.

There are occasional sequelæ. One patient suffered from vertigo until her death, which occurred many years after the original illness. Another complains occasionally of typical headache, with nystagmus and vomiting; her original attack took place some years ago. She is becoming progressively more deaf. The nature of her deafness had not been ascertained.

In treatment salol seems to help; the patients as a rule think it gives comfort. I imagine it cuts short the vomiting.

ACUTE HÆMORRHAGIC NEPHRITIS.

By J. C. ENGLISH,
Gunnedah, New South Wales.

In May, 1934, I attended a girl, aged twelve years, with acute hæmorrhagic nephritis of two days' standing, and on the following day two of her brothers, aged sixteen and eleven years, with the same condition. In the younger brother it was severe, and ten days after the onset he developed cerebral oedema. He recovered slowly and incompletely. The other two recovered completely.

In the most severe case, that of the younger boy, there was a mild unilateral acute tonsillitis but of only two days' history. I could trace no other cause. This boy's tonsils were removed in August, 1934. None of the three children relapsed.

On May 19, 1936, I saw a younger sister, aged two years, with a severe attack of acute nephritis, and could find no cause.

It must be rare for three children in one family to develop this complaint simultaneously, and suggests a communicable infective agent, I suppose a hæmolytic streptococcus, with a markedly selective toxic action on the kidney. Evidently the enucleation of the suspected tonsils did not remove the source of this agent, or else the fourth case is coincidental. I cannot think this likely.

The family history of these children does not suggest any congenital susceptibility of their kidney tissue to intoxication. No doubt the next generation will see, quite wrongly, a threat to itself in the kidneys and blood vessels of this one.

Reviews.

A HOME MEDICAL ADVISER.

THE "Modern Home Medical Adviser" must certainly be the best book of its kind ever written.¹ It is a large volume of 854 pages, and every sentence is interesting. This is easily understood, for the work is edited by Morris Fishbein, one of the most gifted medical journalists alive. In addition to undertaking the editorship, Dr. Fishbein has contributed introductory remarks to most of the thirty-three chapters into which the book is divided, and has himself written a number of the sections. These include the chapters on "The Choice of a Physician", "The Family Medicine Chest", "Old Age", together with long articles on infectious, transmissible and venereal disease, the care of the teeth, the hygiene of women, and rhinology.

Dr. Fishbein has evidently selected his collaborators in this fine work with great care. The chapter on diabetes is from the pen of Dr. Elliott P. Joslin, a testimony to the general high standard of the book. Dr. Joslin's writings bear the impress of kindly authority, and convey the sense of genial optimism which distinguished the small manual published by the same author some years ago. And Dr. Joslin has humour. Inveighing against the practice of over-eating, he writes:

Most of those who have diabetes in middle life were fat before they got it. Take any group of diabetics of the age of fifty years or more, and most any ten of them put together weighed a ton before they developed the disease. Over and over again, I have demonstrated this to my classes of patients, and this is what we can call blamable diabetes . . . if obesity had been avoided, diabetes might have been prevented.

On the page opposite to that bearing these sentences is a sprightly little drawing illustrating how twenty men, ten fat and ten lean, fare as they walk through life from thirty to eighty. Up the page they climb, the lean men brisk and debonair, the fat men lumbering along, so well drawn that they can almost be heard to puff. At the end of the journey, after all the stragglers have fallen out, three thin men (but only a single fat one) have reached the eightieth mile-post.

In so excellent a book as this it is difficult to select outstanding passages or to make comparisons between articles dealing with such a diversity of subjects. All the writers have the gift of explaining simply, concisely, and in an attractive way the latest discoveries in medicine and the latest views upon hygiene. There is a delightful absence of shame-faced prudery about the volume, and of the bowdlerism which was a feature of writings of this kind in years gone by. We would recommend all who can to read the chapter on sex hygiene, by Dr. Thurman B. Rice. It is one of the finest, as it is one of the most useful, chapters in the book, and it is written with a lucidity and a taste for the *mot juste* which give it a charming distinction. Of the bearing of middle life upon the sexual life of man, Dr. Rice has this to say:

Warthin points out that at every age some part of the body is old and worn out and is making way for something else. Even before birth some parts have atrophied and have made way for growing structures. At the time of birth the senile afterbirth is dropped as worn out and no longer needed. It has served its purpose and is cast aside as useless baggage. The thymus of the child is old, or should be, when the child is adolescent; the womb and the ovaries are old at forty-five; the prostate and the testicles are commonly old in the sixties; the body as a whole is old

at seventy or shortly thereafter. Those who are religiously inclined—and religion is a great asset at this or any other age—will see in old age and death a further sublimation in which the earthly body is dropped, as was the afterbirth, as being a useless encumbrance to the spirit, which is immortal.

So complete is the work of Dr. Fishbein's band of helpers that scarcely any topic of medical interest remains unmentioned. The reader will find treatises on the care of the feet and of the skin, on allergy, X rays, the endocrine glands, deficiency diseases, heart and circulatory affections, and much else. The book is perhaps best described as a sort of family "Osler" for intelligent people. We have made allusion to the illustrations. They are uniformly excellent. In the forefront of the volume are four well-coloured anatomical plates, and the text is made clearer (if that were possible) by photographs and drawings of the highest standard. The index, which covers fifty pages, is admirably complete.

A SURGICAL HANDBOOK.

E. C. MEKIE, who is a surgical teacher at Edinburgh, has been induced by his former students to write a "Handbook of Surgery". On reading it we realize the foundations upon which the fame of Edinburgh as a teaching school are founded.² It has the virtues and faults of a handbook: conciseness that in some sections is too pronounced.

At the beginning of each chapter devoted to the disease of an organ or organs there is a page or so in smaller print devoted to anatomy, physiology, and in some cases embryology; pathology also occupies a prominent position, as we should expect from a good teacher. All these tend to make the clinical features more intelligible.

The theory underlying the practice of radiation therapy is dealt with concisely and accurately; it is an important part of a modern surgeon's knowledge.

In chest surgery the various aspects of empyema are dealt with satisfactorily; perhaps a little more space might have been devoted to gunshot wounds of the chest, for example, the first aid treatment of shell wounds of the thorax to prevent that "mediastinal flutter" which results from an extensive pneumothorax. There are times when we think a knowledge of war surgery would be an advantage.

The author, in dealing with cancer of the breast, records an interesting observation, namely, that "experimental work in mice has shown that obstruction to the free escape of milk from the lactating breast is an important fact in the causation of mammary cancer, and that because of this the upper and outer quadrant is peculiarly often the site of tumour formation." If this is established, then it adds one more condemnation to inefficient drainage, which we already know to be one of the most important factors in the delayed healing of a wound.

In dealing with chronic mastitis and allied conditions he has not much to say about ovarian dysfunction; very rightly so, in a subject that is not yet clarified. The manufacturing chemist quite makes up for any reticence on our part.

Peripheral vascular disease is dealt with briefly; it is a subject to which modern investigation is adding to our knowledge. Professor Fraser, to whom the author pays tribute as one to whom he owes much, has written very interestingly on it in the journals; from a recent article of his the author might have incorporated some facts of interest.

The book is a pleasure to read; it is accurate and up to date. For advanced students and young practitioners it is excellent. There is not one of us who would not profit by reading it.

¹"Modern Home Medical Adviser: Your Health and How to Preserve It", by various authors, edited by Morris Fishbein, M.D.; 1935. New York: Doubleday, Doran and Company, Incorporated; Sydney: Virtue Book Company. Super royal 8vo, pp. 936, with illustrations. Price: £2 5s.

²"Handbook of Surgery", by Eric C. Mekie, M.B., Ch.B., F.R.C.S., with foreword by John Fraser, M.C., M.D., Ch.M., F.R.C.S.E.; 1936. Edinburgh: E. and S. Livingstone. Crown 8vo, pp. 711. Price: 12s. 6d. net.

The Medical Journal of Australia

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THE PREVENTION OF DEAFNESS.

THE deaf man lives in a world by himself; a barrier has descended between him and his fellow man, and the outside world has become for him a dumb show. Writing in this journal a year or two ago, Dr. Arthur Murphy, of Brisbane, compared a deaf man with an onlooker at a ball, "seeing the somewhat meaningless circulation of the dancers, without hearing the music that activates them". Small wonder is it that deaf persons try to hide their disability and that many of them will not acknowledge their deafness even to themselves. There are many ways, of course, in which deaf persons may be helped, but we do not propose to discuss them. We wish rather to pursue the theme of prevention, which in many instances is possible.

The prevention of deafness must lie to a very large extent in the hands of the general practitioner. It has been stated that four-fifths of all deafness originates in the middle ear and that half the cases of deafness actually originate in acute *otitis media*.

The infectious diseases of infancy and childhood—measles, pertussis, varicella, diphtheria and scarlet fever—come to mind at once as conditions which are likely to be followed by middle ear infection. If these conditions cannot themselves be prevented, the medical attendant can at least keep watch for the appearance of middle ear complications; he will in certain circumstances forestall their advent by prophylactic treatment. In bronchitis, in bronchopneumonia and in influenzal and intestinal infections also he will watch for middle ear involvement. He will not forget that congenital syphilis may be present, with its far-reaching powers for evil and its common inclusion of the ear in its ravages. He will pay particular attention to the child with catarrhal symptoms and he will not forget that allergic signs may be the forerunner, if not actually indicative, of pathological change that is likely to affect the ears. Lastly, and by no means least, he will allow no child whose nasopharynx is blocked by adenoid tissue to go without relief.

Watchfulness on the part of the attendant practitioner means that he is not to wait until involvement of the ears is staring him in the face. He must be expert in the examination of children; he must be so familiar with normal appearances that he can at a glance recognize early pathological change. Just as many practitioners become expert in laryngeal examination by inspecting the vocal cords of every patient with a cough, whether there is reason to suspect laryngeal involvement or not, so may those attendant on children become expert with the frontal mirror and aural speculum. A bulging ear drum must be instantly recognized, and it should be treated by careful incision and not left to burst in Nature's generous fashion. Early incision of a bulging tympanic membrane would eliminate much permanent aural damage; and skill and courage in making the incision are easily acquired. The wise general practitioner, moreover, will not retain under his treatment for very long a child with a discharging ear, but will obtain the best possible advice from a colleague experienced in surgery of the ear.

In this discussion there is no need to emphasize the removal of adenoids that are causing trouble. The removal of adenoids has been one of the factors that have made ear disease much less prevalent than it used to be; and in this the regular inspection of school children by school medical officers has played no small part. There is also no need to discuss the use of antiseptic drops and other means that may be adopted to prevent infection of the ears; these are described in any text-book on diseases of the ear, nose and throat. Children might, however, as one well-known rhinologist has pointed out in this journal, be taught the proper use of the pocket handkerchief. Every measure that can be brought to bear on this subject is of importance, for, to quote Dr. Murphy again: "Deafness is preventible, but deafness is incurable."

Current Comment.

OSTEOMYELITIS.

Two views of the nature of osteomyelitis are held. According to one, the lesion of the bone is of primary importance; according to the other, the bone lesion is a local manifestation of a septicæmia. The treatment adopted will, it must be supposed, depend on which view is held by the attendant surgeon. Those who hold the lesion in the bone to be of primary importance would agree with Dean Lewis, who wrote in 1929:¹ "If the sequelæ of acute osteomyelitis . . . are to be avoided, the diagnosis must be made early and an early operation performed." Those who regard the condition as a septicæmia will put the affected limb at rest, and, adopting conservative treatment that will enable the patient to increase his resistance, will operate only in the late stages to let out pus or to remove a sequestrum. In the past, operation was generally undertaken as soon as a diagnosis was made, but the practice of the present day is gradually becoming more conservative. The septicæmic view would appear, therefore, to be finding favour.

In 1928 a discussion on osteomyelitis was held in Sydney and papers were read by R. B. Wade, W. Vickers and J. Colvin Storey.² Wade was opposed to extensive operation and was content in most instances with incision of the periosteum and drilling the bone with a small trephine. Vickers was of much the same opinion. Storey, however, was definite in his view that the whole issue was a

contest between the infecting organism and the host. He urged that operation should be undertaken only when frank signs of deep pus were present. In the subsequent discussion opposition to this view was manifest. Conservative treatment is advocated in the article on acute osteomyelitis appearing in "The Medical Annual" and written by J. Fraser (of Edinburgh). Fraser refers to his own advocacy of the view that the bone lesion is a fixation abscess that has "a useful purpose in providing immunity bodies which tend in some measure to overcome the general infection". He thinks that in these circumstances the local focus may be regarded as being in some measure productive of a beneficial action on the course of the disease. In his opinion, operation should be limited to the early stages of the disease; it should consist in draining the medullary space (in the fashion described by Wade) by perforating the cortex by a drill, and the superficial wound should be left open. Fraser then gives references to other writers. Tyrell-Gray was more conservative. He reported that for five years he had not operated in a case of osteomyelitis and that during that period he had not had a death. He concentrated upon the general infection by intravenous injections of mercuric chloride, by intravenous serum injection and by occasional blood transfusion. He used simple incision when superficial abscess formation occurred. W. T. Green, in discussing pyogenic infection of bones and joints in infancy, decries early operation; he thinks that "these cases seem to do about as well when one awaits localization and drains the soft tissues only". Langer and Salzer in Germany, in independent reports, have also upheld the method of waiting until the infection has become localized. Fraser attaches significance to the fact that all the papers mentioned by him are without exception in favour of a more conservative attitude than has hitherto been adopted. He summarizes the principles as follows: (i) to put the limb at rest, (ii) to employ means that combat the general infection, (iii) to employ drainage of the affected area when pus formation appears. He adds: "The advantages claimed for the procedure are that the mortality is reduced and subsequent sequestration rendered less likely."

In view of these statements it is of interest to note a recent report by W. T. Green and J. G. Shannon of acute osteomyelitis occurring in eighty-two infants under two years of age.¹ Green and Shannon hold that osteomyelitis of infants is a disease different from osteomyelitis of older children. Their communication is an interesting survey of the whole condition; at present, however, we are concerned only with the question of operative treatment. Of the 82 children, 37 were treated by operation on the bone and seven of these died; 34 were treated by drainage of the soft tissues and eight of the 34 died. Eight children were treated without surgical operation; all of them recovered. Only two of the eight, however, were critically ill;

¹ *The Journal of the American Medical Association*, March 9, 1935, page 786.

² *THE MEDICAL JOURNAL OF AUSTRALIA*, March 2, 1929.

¹ *Archives of Surgery*, March, 1936.

in one instance *Streptococcus hæmolyticus* was recovered from the blood on culture, and in the other *Staphylococcus aureus* was grown. The numbers are obviously too small to permit general conclusions to be drawn. It is interesting, however, to note that of six patients with osteomyelitis of the neck of the femur, three who were treated by immobilization with constant observation and without operation did better than those in whom drainage was established by surgical operation. The first consideration on which Green and Shannon based their treatment was that the patient rather than the osteomyelitis was the important consideration. They believe that surgical intervention at an early period of the disease is not essential, and that if an operation is performed on the bone it should not be extensive. They insist that the part should be immobilized, preferably in a plaster cast. In other words, they lean to conservatism in treatment.

There is no doubt that osteomyelitis is generally the result of a blood-borne infection. There is also no doubt that treatment is becoming more and more conservative. Surgeons may not be ready to adopt either the view of causation put forward by Fraser or the treatment of Tyrell-Gray, but they will probably agree that bacteriological and immunological studies are likely not only to determine the pathogenesis, but to make available useful therapeutic weapons.

POLIOMYELITIS.

THE interest in anterior poliomyelitis is widespread, not only among members of the medical and nursing professions, but among the laity. It is evident that there is a general belief among the laity that the disease is confined to young children, as indeed the misleading name of "infantile paralysis" would suggest. Now that accurate studies of epidemics are made, the mutability of these various visitations is more and more noticeable, and one of the phases of variations noticed is the affection of adults by poliomyelitis. It often happens, too, that at times when scattered cases of infectious diseases occur, aberrant types are observed, adding to the difficulty of diagnosis. It has been pointed out recently in these columns that the Australian X disease of some years ago bears certain definite resemblances to the "louping ill" of sheep. Here is one possible variety of virus infection of the nervous system which, with *encephalitis lethargica*, is distinct from anterior poliomyelitis. This would not be of much interest here if it were not that cases of poliomyelitis are occurring in adults at intervals, and, since the histological picture in the nervous system in fatal cases is by no means characteristic, have in certain instances given the impression that they could be called poliomyelitis only for want of a better name. Further, scattered cases of some variety of enceph-

litis have been observed, which still further complicates the diagnostic and pathological picture. It is of interest therefore to learn that an analysis of the Californian epidemic of poliomyelitis of 1934 shows that cases in adults were not frequent, and that there were many differences between these and the more usual forms of the disease.

J. C. Wilson and P. J. Walker have drawn attention to this in an account of the orthopaedic aspects of this epidemic, in which 3,333 persons were attacked and 110 died.¹ They remark that in previous epidemics there has been a steady shift towards the higher age groups, and so it proved in the Californian series also. Nothing specially noteworthy emerged from a study of the onset of the disease, though the increased alertness of doctors in general resulted in recognition of the infection at an earlier stage. The most constant symptom was headache, and indeed in 49 cases it was the only symptom. In the adult patients sensory symptoms predominated, not only headache, but backache, more or less severe, and pains in the extremities. Still more interesting were the vasomotor and trophic disturbances which were practically constant. Excessive sweating or, on the contrary, abnormal dryness of the skin with coldness or cyanosis was the more usual phenomenon. Even exfoliation of the skin of the affected limbs occurred, followed by atrophic changes. In regard to the vasomotor changes, it was felt by some observers that there was a generalized disturbance of vasomotor control; and a suggestion is put forward that this might account for the emotional instability often noticed, and perhaps also for a curious tendency for exacerbation of symptoms to occur even in convalescence without any obvious reason. About one-third of the adult patients suffered from inflammatory changes in and about the joints. In some cases these merely took the form of transitory pain and tenderness, but in many others more definite proliferative changes occurred, sometimes resulting in fibrosis and contractures.

In summing up their views on these cases in adults, Wilson and Walker point out that they occurred at the height of an established epidemic of poliomyelitis among children, and that the majority of the patients were nurses in contact with these children. These facts strongly suggest that the disease really was poliomyelitis in spite of the atypical nature of its course in the older patients. C. O. H. Park, however, in a discussion on this paper, doubted whether all the adults really suffered from poliomyelitis, an opinion shared by Maurice Brodie, who thought that their symptoms rather resembled those of the Australian X disease. All this shows the necessity for the accurate observation of cases occurring in adults in Australia; all available facilities should be utilized for investigation, and the publication of adequate case records would also be of value.

¹ Archives of Internal Medicine, March, 1936.

Abstracts from Current Medical Literature.

MEDICINE.

Lobar Pneumonia.

ILAH I BAKHSH AND A. T. ANDREASEN (*The Indian Medical Gazette*, December, 1935) describe the treatment of lobar pneumonia by the intravenous injection of alcohol. They point out that drugs have persistently failed in the treatment of lobar pneumonia, and they remark that the application of specific antiserum seems to be "even more limited than was previously supposed". Sutcliffe and Finland state that antiserum can be employed with value in only one of every ten cases in which pneumonia is suspected. The authors go on to say that modern research has failed to solve the problem of the treatment of lobar pneumonia and has failed "to give the physician a weapon wherewith to combat this dreaded disease". The oral administration of an alcoholic beverage, although rendering the patient momentarily peaceful, does more harm than good because of its specific action on the cells of the liver. The intravenous administration of alcohol was used by Landau, Fejgin and Bauer in 1931 in the treatment of persons suffering from pulmonary suppuration. They believed that alcohol administered intravenously did not reach the liver in any large quantities, as it passed directly from the right side of the heart to the lungs, where it was taken up by the pulmonary reticulo-endothelial cells. In this way they thought that alcohol remained in the lungs and exerted a bactericidal action. They gave small doses of insulin to protect the liver cells from the small quantity of alcohol that might reach them. The authors employ 20% of alcohol in sterile normal saline solution, giving injections of 20 to 25 cubic centimetres a day. The injection causes a feeling of chilliness, which lasts twenty minutes to three-quarters of an hour. In one of their six cases there were rigors, necessitating a reduction of the dose to ten or twelve cubic centimetres (given twice a day). They found that the strength of the solution could be increased to 33% without any untoward effect. Induration without suppuration was the only ill-effect of inadvertent subcutaneous injection. Within an hour after the first injection, in every one of the authors' cases, the pain decreased sufficiently to allow the patient to sleep in comfort; within 48 to 72 hours the pain had completely subsided. Cough, though sometimes stimulated during the actual injection, decreased steadily, and the sputum changed within two or three days to a clear non-viscid substance. The respiration rate was lowered and the dyspnoea was greatly reduced. The course of the disease

was not cut short; but consolidation was arrested and resolution was rapid. When the administration of alcohol was commenced early in the disease scarcely any signs of pneumonia were revealed by clinical examination of the chest at the time of the crisis. In all cases but one the leucocyte count gradually decreased with the regression of the signs and the general improvement in the patient's condition. The injections caused an immediate change from a state of acute distress to one of ease and sleep. The authors state that as results of this method of treatment: "Pain and cough are immediately relieved, the consolidation is arrested and regresses, the patient's distress vanishes and he sleeps well, and the 'defences' of the body are apparently not interfered with." They admit that no conclusion can be drawn or hypothesis offered; but they feel that this new method of the treatment of lobar pneumonia is worthy of further investigation and trial.

Gallop Rhythm.

C. BRAMWELL (*The Lancet*, January 25, 1936) discusses gallop rhythm and the physiological third heart sound. Under certain conditions three sounds accompany each heart cycle. The third sound either succeeds the normal second sound, "lûb dûpp dûpp", or precedes the normal first sound, "lûb lûb dûpp". The former, termed protodiastolic sound, is physiological; the latter, presystolic, is pathological and of grave significance. The majority of patients exhibiting this sign do not live eighteen months. The sign occurs with acute endocarditis, chronic Bright's disease, essential hypertension and coronary arteriosclerosis. The presystolic sound alluded to is always synchronous with auricular systole and is due to the vibration of the wall of the atonic ventricle. The protodiastolic sound, which is not to be confused with reduplicated second sound (heard only at the base) is heard at the apex, mainly in young people, and is the normal third heart sound, produced by the vibration of the auriculo-ventricular valves.

Blood Iodine.

H. J. PERKIN, F. H. LAHEY AND R. B. CATTEL (*The New England Journal of Medicine*, January 9, 1936) describe blood iodine studies in relation to thyroid disease. In thyroid overactivity there is a low content of iodine in the thyroid gland and blood iodine is increased. If iodine is administered in Lugol's solution, the blood iodine decreases and the iodine in the gland increases, with clinical improvement in weight, pulse rate and metabolic rate. This change takes place within four to ten days. Later, the clinical condition regresses, though iodine be continued, and a condition suitable for operation cannot be obtained unless iodine is suspended for several weeks and then adminis-

tered again. One hundred and twelve normal subjects were tested and found to have a blood iodine content between 0.001 and 0.018 milligramme per centum. In non-toxic adenomatous goitre 0.002 to 0.012 milligramme was the figure. In primary hyperthyroidism 0.002 to 0.14 milligramme was recorded, an average of 0.021 milligramme being found. However, 30% of these patients had a normal blood iodine, and they comprised those who were more seriously ill. They did not respond well to iodine, and a two-stage operation was performed because of this. In toxic adenoma blood iodine averaged 0.02 milligramme per centum, but 23% of those tested had normal blood iodine; the condition of half of these latter was serious enough to warrant a two-stage operation. Following subtotal thyroidectomy for hyperthyroidism the blood iodine decreased markedly in those patients in whom clinical improvement occurred. Recurrence of symptoms was noted, especially in those who had a normal blood iodine before operation. Fifty patients with hyperthyroidism who had a normal blood iodine before operation had either been treated with iodine repeatedly or had received X ray treatment. The clinical state of these patients was more serious than those with a raised blood iodine. An iodine tolerance test is described: 37.5 milligrammes of iodine as Lugol's solution are given in milk, blood is withdrawn at half-hourly intervals afterwards and the iodine content is determined. It was found that the blood iodine did not rise to so high a level in hyperthyroid patients as in normal persons.

Acute Glomerular Nephritis.

A STUDY to determine the relative importance of the various symptoms and signs in acute glomerular nephritis with regard to prognosis, both immediate and late, has been made by Arthur B. Richter (*Annals of Internal Medicine*, February, 1936). One hundred patients were observed, ten of whom died during the acute stage; five of these deaths were due primarily to acute nephritis. Oedema, non-uræmic convulsions, hypertension, neuroretinopathy, myocardial failure, uræmia, gross hæmaturia and albuminuria were the only signs which seemed possibly related to the outcome of the nephritis. The incidence, degree and duration of oedema was of no prognostic significance. The seven patients who exhibited convulsive seizures due to hypertensive encephalopathy recovered completely and from five to fourteen years later are without evidence of chronic nephritis. Hypertension occurred in about 50% of cases and was an early sign; the general rule that a gradually rising blood pressure, persisting longer than a few days, is an unfavourable sign was borne out in the two cases in which it was applicable, one patient dying in the acute stage and the other developing chronic nephritis. Only one of the

three patients dying of uræmia developed hypertension, and this was minor. Slight neuroretinopathy, consisting of oedema of the disk and retina with constriction of the retinal arteries, was observed in three patients of the series, all of whom recovered. Four patients with symptoms of left heart failure recovered. Gross hæmaturia occurring in 42% of cases was not related to the ultimate issue. Albuminuria was present in 100% of cases. Renal function as determined by the usual tests is of little significance in most cases of acute nephritis. The three patients who died of uræmia had anuria and a urea nitrogen of more than 120 milligrammes per hundred cubic centimetres. The criteria for complete recovery from acute nephritis consisted of normal responses to kidney function tests, normal findings on examination of the urine and normal blood pressure. Eighty-one of the ninety patients who survived their acute nephritis have been traced and the renal state of seventy-seven has been determined. Albuminuria is the most delicate evidence of the presence of nephritis, and special attention has been paid in this study to the degree and duration of the albumin content of the urine and its relation to prognosis. The results indicate that when albuminuria has persisted for a year or longer after the onset of acute nephritis, the chances of the condition becoming chronic are six to one. It is emphasized that clinical cure of the acute nephritis may not always represent cure of the underlying aetiological and pathological processes. The nephritis may be manifest only during exacerbations of the underlying acute infection, the urinary and kidney function studies giving entirely normal findings in the interim.

Bronchoscopy in Bronchial Asthma.

LOUIS H. CLERF (*Annals of Internal Medicine*, February, 1936) discusses the value of bronchoscopy in the differential diagnosis of wheezing respiration and its use in the treatment of bronchial asthma. In the true asthmatic the bronchoscopist observes collapse of the trachea and bronchi during cough and forced inspiration, and also the presence of abnormal secretions. At the beginning of expiration there is noted in many cases a definite collapse of the trachea, usually limited to the posterior wall, which, bulging forward, becomes convex and fits into the concavity of the anterior wall, a crescentic lumen resulting. Occasionally the lateral walls collapse and give a triangular lumen. At the beginning of inspiration the lumen promptly returns to its normal rounded appearance. Such changes are also observed in some cases in the bronchi themselves. This finding is not absolutely characteristic of all cases of asthma. Two groups of patients are discussed in reference to treatment. The first group con-

sisted largely of adults who dated the onset of the asthmatic symptoms to an acute upper respiratory infection; tightness and constriction of the chest with paroxysmal attacks of cough were common symptoms; mucoid or thick muco-purulent sputum was very frequently seen, and removal of this secretion was followed by reduction of the subjective symptoms. Moderate inflammatory changes were noticed involving the mucosa of the larynx, trachea and larger bronchi, with thick muco-purulent secretion adherent to the walls. Removal of the secretion by aspiration through the bronchoscope gave prompt relief to the subjective symptoms. When aspiration was repeated at intervals, the attacks either did not recur or produced only slight distress. The material thus aspirated is the best for the preparation of autogenous vaccines. The second group consisted largely of children and came under the observation of the bronchoscopist because the clinical features were such as to suggest that a foreign body was lying in the trachea. Examination with the bronchoscope failed to reveal any foreign body, but subacute inflammatory changes were noted in the trachea and bronchial tree, with large quantities of tenacious greyish secretion. The immediate relief secured following the aspiration of this material was not unlike that observed after removal of a partially obstructing tracheal foreign body.

Asthma.

P. VALLEY-RADOT, P. BLAMOUTIER AND F. NIITI (*La Presse Médicale*, March 18, 1936) review the literature and describe investigations into the rôle of bacteria in asthma and the indications for vaccino-therapy. The sputum of fifty asthmatics was carefully investigated at the Pasteur Institute. The hæmolytic streptococcus and *Streptococcus viridans* heavily predominated; the pseudo-meningococcus, often described as *Micrococcus catarrhalis* or Gram-negative coccus, was next in frequency. Pfeiffer's bacillus, Friedländer's bacillus and the pneumococcus occurred less frequently. All these organisms, when occurring in asthmatic sputum, were difficult to cultivate. Much the same organisms were found in chronic bronchitis. Cutaneous inoculation with organisms from the sputum, either by the scratch or intradermal method, failed to reveal any indication that sensitiveness to bacteria was a cause of asthma. Vaccino-therapy sometimes gave excellent results in asthma, but mainly when the asthma was complicated by bronchitis. Of sixty patients so treated, two-thirds were improved. The same organisms, however, persisted in the patients' sputum. Vaccines acted in two ways, by protein shock and specifically for certain organisms. Each suitable dose of vaccine is followed by slight elevation of temperature and a polymorphonuclear leucocytosis; this effect

raises the resistance of the patient. Though vaccine therapy frequently improves the health of patients subject to asthma and bronchitis, the asthma may persist, though in a less severe form; the bronchitis improves to a much greater extent than the asthma. Children were found by the authors to benefit more by vaccine therapy than older subjects. Treatment should be prolonged over many months at first by tri-weekly injections, later by a fortnightly dose. Intradermal injection in the dorsal region, into a different area each time, is recommended. The authors used autogenous vaccines at first, but later a stock vaccine was prepared, containing *Streptococcus hæmolyticus* and *viridans*, pseudo-meningococcus and pneumococcus Type 3, in the proportions of one and a quarter billion of each of the streptococci, to 750 million of the two latter organisms. There were four billion bacteria per cubic centimetre. The first dose contained 0.1 cubic centimetre, and each subsequent dose was increased by 0.1 cubic centimetre until 1.5 or even 2.0 cubic centimetres were given. Marked local or general reactions should be avoided. Preventive inoculation with the above vaccine was found effective in patients prone to recurrent bronchitis.

Cerebral Circulation.

J. TINEL AND G. UNGAR (*La Presse Médicale*, January 29, 1936) discuss the regulation of the cerebral circulation and describe their experiments directed to prove that there exists a cerebral vasomotor mechanism. The sino-carotid reflexes preserve the circulation of the brain automatically from the effects of sudden hypertension or hypotension. Clinically, spasm of the cerebral arteries alone can explain transient aphasia, hemiplegia, hemianopia and epilepsy. Further, pallor of certain areas of the brain has been observed during operation in convulsive states, and the retinal arteries have been observed to contract. Histologically, it has been shown that cerebral arteries are accompanied by nerve fibres. Experimentally, sympathetic fibres from the cervical chain and parasympathetic fibres from the cerebral trunk by way of the great superficial petrosal nerve have been proved to supply the cerebral vessels. Acetylcholine causes a dilatation of cerebral vessels, as did histamine, whereas oxygen and the pressor substance of the posterior pituitary cause vaso-constriction. Under particular experimental conditions the authors have produced contraction of the cerebral arteries by means of adrenaline and by sympathetic stimulation, and have demonstrated this effect by direct observation of the pial vessels through a trephine opening. In spite of the vasomotor mechanism the cerebral circulation remains constant, except under abnormal conditions, by means of reflex control partly supplied by the sino-carotid apparatus.

British Medical Association News.

SCIENTIFIC.

A MEETING of the Section of Oto-Rhino-Laryngology of the New South Wales Branch of the British Medical Association was held on December 10, 1935, at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, Sydney, DR. D. G. CARRUTHERS in the chair.

Primary Bronchogenic Carcinoma.

DR. GARNET HALLORAN read a paper entitled: "Primary Bronchogenic Carcinoma" (see page 1).

PROFESSOR HAROLD DEW said that nowadays diagnosis was made more accurately than formerly. The cytology of bronchogenic tumours was known to be very varied. His experience was mostly confined to pathological specimens, and these showed a great variety, both in site of origin and in appearance, and it did not appear likely to him that bronchoscopic manoeuvres would ever succeed in effecting a cure. Ninety per centum were peribronchial and many arose in the hilar region. Lobectomy appeared to have succeeded only rarely, on account of early metastases. Some cases were, however, peripheral, and these might be confused with hydatid cysts *et cetera*. Hydatid cysts were more opaque to X rays and concealed the rib shadows, while in the case of neoplasm the ribs could usually be seen.

Age was an important point in diagnosis, as hydatids were rare in the cancer age period, while cancer was unusual under thirty-five years of age. There was no doubt that lipiodol was useful as a diagnostic aid, although one had to recognize the difficulties caused by thick pus, and there seemed no doubt as to the value of removing it before putting in the oil. Professor Dew was in accord with the claims for the value of examination of exudates and effusions. The cytology of discharges was of the greatest value in this and other cases, as sections were quite easy to make and often gave valuable information. He agreed that they in New South Wales were somewhat behindhand in surgery of the chest as well as in neuro-surgery and that the results abroad were very encouraging.

DR. A. T. NISBET thought there was no danger of lipiodol giving off any harmful radiations. He referred to the efforts of Todd and Blair Bell in introducing selenium and lead for the purpose of producing such radiations for beneficial effect to be obtained. The term "deep radiation" should be abandoned and "X radiation" used in its place. He had never seen a case of bronchogenic cancer cured by radiation. Radiation relieved the pain and sputum to some extent. The difficulties of diagnosis in hospital were increased by the bad quality of many of the films produced. Great care was necessary to make films of the best quality. It was rare to see primary cancer shadows far out in the lung. He usually found that radio-sensitivity of a growth could be established in a period of two weeks. If the growth was not sensitive in that time he would regard lymphosarcoma and Hodgkin's disease as excluded. When close to the hilum the shadow might be difficult to interpret. He was doubtful about the value of putting radium or radon in position down a bronchoscope. Perhaps the technique for doing this might be improved so that more radon could be used for wider fields than usual. He had seen one patient who had undergone lobectomy.

DR. LAURENCE HUGHES had seen three patients with proved carcinoma of the lung during the past year, and they showed certain clinical features which were interesting from a physician's viewpoint. All the patients were over fifty years of age. The first had a history of chronic bronchitis and asthma for a number of years. A year before admission to hospital he had pleurisy and shortly afterwards began to cough up small quantities of

blood-stained sputum. Three months before coming to hospital he had pneumonia, which was followed by definite hæmoptysis. He was admitted to hospital with a provisional diagnosis of pulmonary abscess, but carcinoma of the lung was found *post mortem*. A history of small recurring hæmoptyses in a patient over fifty years of age was definitely suspicious of carcinoma. The second patient was admitted to hospital with marked dyspnoea and a large quantity of fluid was detected in the right side of the chest. This was aspirated and was almost clear in appearance, and the pathological examination revealed nothing suggestive of carcinoma. Subsequent X ray examination of the chest did help in the diagnosis. The chest quickly filled again, and when tapped the second time the fluid contained blood. Rapidly recurring pleural effusions in elderly people were also suspicious of carcinoma. The third patient had very few symptoms except persistent pleural pain, which was difficult to relieve.

DR. G. DAVIES was interested in the remarks made concerning the sputum section test. He would like to try it. He thought that examination of isolated cells in an exudate might be misleading. Their behaviour was not seen and their true character was difficult to estimate. He thought that it would be necessary to establish criteria by which it would be possible to judge malignant disease in sputum slides. Otherwise it would be difficult to draw conclusions. When biopsy material was taken by bronchoscopy the amount of tissue was small and it should not be allowed to dry. It should be placed in fixing fluid immediately or should be kept moist with saline solution until this was available. Growths at a distance from the hilum might present difficulties even at *post mortem* examination, and sometimes it might be hard to say whether they were primary growths of the lung. Probably such growths did occur as primary growths. One interesting type was the growth with squamous cells. This usually occurred later in life. Such growths often contained cavities.

DR. COTTER HARVEY thanked Dr. Halloran for inviting him to listen to his interesting paper. He was sure that the bronchoscope was not availed of nearly enough in this country as a diagnostic instrument in pulmonary disease. The improved technique of modern bronchoscopy gave more accurate information than had till then been thought possible. It had been stated, in regard to bronchial carcinoma, that the case in which the bronchoscopic finding was positive was inoperable. This was a most depressing statement and he hoped to find that it was not wholly true. Though the majority of tumours arose close to the hilum of the lung, it seemed that some were removable by operation.

In the diagnosis of bronchial carcinoma he had found that two of the most important diagnostic points were recurrent hæmoptysis and pain in the chest. Dr. Halloran's second case illustrated these points. In one of Dr. Harvey's own cases hæmoptysis had recurred at intervals over a period of five years and it had remained the only symptom. It was an established axiom that a patient with recurrent hæmoptysis, lacking a definite diagnosis, had the right to a bronchoscopic examination. He drew attention to the skiagram of Dr. Halloran's second case, wherein there was an opacity of the lower third of the right lung. This case happened to be a patient of his, and he had submitted him to a surgeon with a view to possible operation. The surgeon decided that the mass was so large as to be irremovable; this was a fundamental error. With a stenosed bronchus there was often collapse of a lobe or even of the whole lung, but the actual growth might be no larger than a walnut. The X ray shadow had therefore to be interpreted with caution.

Another diagnostic guide in lung cancer was the maintenance of good general condition. Dr. Harvey had been dismayed at hearing a surgeon refuse to explore the chest because the patient looked well and was gaining weight. To await cachexia might be to make diagnosis more secure, but it was a counsel of despair and no advance in therapy could come in this way.

Though the giving of lipiodol through the bronchoscope might be the best method, there was one point to note. A constricted bronchus might be seen through the instrument and lipiodol injected beyond the site of the lesion. The resulting bronchogram might show simply a normal bronchial tree and give no information as to the extent of the stenosed area. Thus valuable evidence, as he had seen in one case, was lost. If no biopsy was obtainable, a bronchogram might be more informative than a bronchoscopic examination.

Carcinoma of the lung could occur at any age, and Dr. Harvey had seen two cases arising in patients under thirty years of age; but the vast majority occurred in the middle, or cancer, age.

Radiation and X ray therapy were at best only palliative and should not be considered before thoracic surgery. He was interested to hear of the sputum section test and would certainly endeavour to make use of it in the future.

Dr. E. P. BLASHKI thanked the visiting speakers and Dr. Halloran. He thought that all examinations of patients with difficult diseases, such as chest cancer, required personal consultation between the members of a team. The physician should be present at bronchoscopic examinations, and both physician and rhinologist should consult with the radiographer. By confining consultations to writing, much of their value was lost. He was interested in Dr. Nisbet's remarks about bad films. This accorded with his own experience in other fields, and the remedy surely lay in the hands of the radiographer to refuse to report on bad material. Surely it was misleading to both the physician and the surgeon as well as damaging to the radiographer to report on bad films. He agreed with Dr. Halloran that lipiodol could be best applied through a bronchoscope, and after preparing the field through this means. The danger of missing the true picture, as suggested by Dr. Harvey, was not a real one, as the field was under observation all the time.

Dr. D. G. CARRUTHERS, from the chair, thanked Dr. Halloran and expressed appreciation of the presence of the visitors. He said he had had little personal experience. One difficulty was the exclusion of syphilis. It was said that a large proportion of lung cancer patients gave a positive response to the Wassermann test. He had seen one patient with a positive Wassermann reaction and long-standing history of blood-stained sputum. The skiagram had not been helpful. Bronchoscopy was useful in excluding benign growths. The meeting was valuable for the inspiration it gave to advancing interest in new work and in promoting closer cooperation, leading to earlier and more accurate diagnosis. Without doubt, if a careful watch was kept for bronchogenic cancer cases, they would be diagnosed more frequently.

In reply, Dr. Halloran agreed that cytology was going to play an increasing part in routine diagnosis. As thoracic surgery was progressing, so it should be encouraged. It must be remembered that over fifty patients with lung carcinoma died annually in New South Wales. If attention was given to these patients by a thoracic clinic committee, no doubt a greater percentage of earlier material would be available for the thoracic surgeon.

He did not advocate the intrabronchial use of radium or radon for the reasons mentioned in his paper and because of the poor results obtained elsewhere. Moreover, the lower edge of the mass could not always be attacked in the small bronchial lumen, and there was the risk of perichondritis.

Case II might have been an angiosarcoma. Its appearance was malignant, and the taking of a biopsy would have flooded the bronchial tree.

Two statements stood out in the discussion, namely, that non-tuberculous hemoptysis demanded bronchoscopy and that carcinoma was radio-resistant. When these facts were generally known, the risks of delayed diagnosis would be minimized.

He disagreed with the thought that lipiodol was used to demonstrate an obstruction at the site of the neoplasm, for such an obstruction was obvious through the broncho-

scope. After the pus below the stricture was aspirated, then lipiodol might percolate and demonstrate the hitherto impenetrable bronchial system distal to the stricture.

Dr. Davies's offer of cooperation in a routine procedure of "sputum section" was welcome.

A COMBINED meeting of the Queensland Branch of the British Medical Association and the Queensland Branch of the Australian Dental Association was held at the B.M.A. Building, Adelaide Street, Brisbane, on May 1, 1936.

Malnutrition, Dental Decay and Oral Infection.

Dr. P. A. EARNSHAW read a paper entitled: "Dental Decay as an Index of Malnutrition" (see page 4).

Dr. R. P. RHEUBEN read a paper entitled: "The Dental Concept of Oral Infection" (see page 13).

Dr. BOYD IRWIN thanked both speakers for their papers. As many others would be wishing to speak after him, he would confine his remarks to Dr. Rheuben's paper.

Dr. Rheuben's paper was an excellent one and he was pleased to hear him stress his attitude to modern crown and bridge work. Crown and bridge work carried out according to the principles Dr. Rheuben had given gave most efficient service and, in his opinion, could not be questioned from a hygienic or health standpoint.

Unfortunately, up to the present time the profession lacked means of determining the exact status of the pulpless tooth which in an X ray film showed an unbroken pericemental line. It could and had been proved possible that a tooth, abscessed, discharging pus through a fistula near its apex, might in a skiagram show an unbroken pericemental line.

To the best of his knowledge there was no dentist in Australia or any other country who knew any method of determining whether a pulpless tooth showing an unbroken pericemental line was not menacing a patient's health. On the other side of the question, there was no one who could prove that any such pulpless tooth was causing harm. There the best they could do with a sick person, as Dr. Rheuben suggested, was to take no chances. In a nutshell, no pulpless tooth was above suspicion from the standpoint of focal infection, and the fewer there were in the mouth, the better.

Dr. Irwin also mentioned a point as to the extraction of pulpless teeth. He had often read that it was not desirable to extract many pulpless teeth at one time. He had himself seen serious enough reactions in healthy people; with sick patients it must be disastrous.

Dr. S. F. McDONALD said that he had listened with the greatest interest and instruction to the two papers. Dr. Rheuben's paper had impressed him particularly by its conservatism and thoroughness. He could remember the days when Dr. William Hunter's work on focal sepsis was new and enthusiastic physicians handed over unfortunate sufferers from all kinds of disease to the dentist, with instructions to eliminate sepsis. The victims returned to the wards later on, shaken and battered, requiring weeks to recover from the shock of wholesale extractions, often worse than the disease from which they had suffered. The dentist as well as the doctors were realizing the importance of saving teeth, not replacing them with substitutes which, however admirable, could not compete with the real article in either comfort or efficiency—in biting raw apples for instance.

Dr. Rheuben's description of dental sepsis had been so clear and simple that he felt sure everyone who had heard it could appreciate the difficulties which beset dentist and doctor. It was especially the work of the physician to confer with the dentist, and if the dentist felt that he could save a tooth, to applaud his moderation rather than blame his weakness.

As regards diet and dentition, history had one interesting example in the Peninsular army. Here the men were issued food, not as flour, but as raw wheat, which had to

be ground on the spot and baked by the regimental cooks. The alternative was hard biscuit. The men were in excellent condition and their teeth gave little or no trouble.

Another example he had seen himself was in a family of ex-Orkney Islanders, whose food was mainly oatmeal, fish, milk and eggs (like the people of Tristan da Cunha). The elder members of the family had wonderful teeth. The youngest had spent the years from five to eight in a hospital in Edinburgh under treatment for double talipes. She had always been much petted and spoiled, and the family especially showed their affection by sending her sweets and cakes. Her teeth were all carious at twelve years.

Recently Dr. Whittle, of Maryborough, had shown his records of some children from a western town who had come to the coast under the care of the Queensland Bush Children's Health Scheme. There were eleven children. Ten had perfect teeth; they had never been out of the west. The eleventh had spent six months in Brisbane and had lived largely on sweets, cake and ice-cream; the teeth were bad.

It was important to those caring for the children of relief workers to know that one such child in each family would be supplied with an extra pint of milk, fruit and vegetables on production of a doctor's certificate.

Diet had often been held to have much to do with dental decay. An example was the work of Sprawson, who contended that the use of unheated (unpasteurized) milk was conducive to dental soundness. He worked among children's homes in the London County Council area, but much of his work had been disputed. The work of Collet was the most recent, but Bunting in America had done similar work some seven years ago.

Finally, Dr. McDonald pointed out the tragic fact that three of the most important Australian industries flourished at the cost of children's teeth—sugar in Queensland, sweets in Victoria, and biscuits in New South Wales.

Dr. H. A. GOLDFINCH said it had been a pleasure to listen to such ably written papers. Between the dental and medical professions the main points of contact were in the realm of mechanics and focal infection. The dentist, because of the nature of his training and the facilities at his disposal, was in a position to assist the surgeon greatly by providing various types of splints for fractured jaws and noses and holders for radium needles *et cetera*.

In regard to focal infection, the dentist was asked daily to report upon the oral and dental condition of sick patients. This giving of an intelligent and valuable report required not only sound academic training, but experience and judgement. The easy way was to apply a fixed rule to all cases—it saved mental effort.

It was very easy to be radical and to recommend the extraction of all pulpless teeth, or even all teeth to make sure, but how many suffering patients by these tactics had had added to them another suffering? Probably not 5% of medical men and dentists could claim to have not at least one pulpless tooth in their mouths. Did this suggest that these men had been unable to harmonize the idea of radical tooth removal with their clinical experience? The presence of bacteria did not necessarily mean the presence of disease; it was a question of immunity.

Dr. Earnshaw's scholarly paper on the question of diet in relation to dental disease, showed how one disease due to bacteria, *Bacillus acidophilus*, had been successfully treated by dietetic means alone. Indeed it would appear that as far as dental caries was concerned, the use of a tooth brush was almost worthless. In regard to pyorrhea, however, dental cleanliness was of very great importance. Fermenting food material, lying around the gum and between the teeth, was one of the commonest irritants leading to pyorrhea.

The question of the dysfunction of the endocrine organs had not been mentioned that night. Broderick and others had pointed out how even emotional states, by reacting on the endocrine organs, could upset the acid-base balance of the blood, with consequent evil result upon the calcified structures, particularly the teeth. Imbeciles had very bad teeth.

One common condition observed by dentists was the soft spongy condition of the gums of some women during pregnancy. This was one case in which the physician could come to the dentist's aid by deciding whether a calcium deficiency or glandular upset was present, and by correcting it.

Diet was a disappointing subject for the dentist, possibly also for the physician, on account of the apathy of the patient.

The nature of a dentist's practice was such that, once he was well established in his practice, he was kept so busy repairing and restoring the dental tissues that he was glad to leave the question of vitamins, hormones *et cetera* to the patient's medical adviser.

Dr. R. GRAHAM BROWN congratulated the committee for arranging the combined meeting of the dental and medical professions, and both lecturers for their excellent presentations of the subject. Both papers had interested him considerably. He felt that there should be a greater cooperation between the dentist and the doctor, and for a long time he had held the opinion that a dentist should first of all be a medical man and that dentistry should be looked upon as a specialized department of medicine. This attitude was being held more and more in other parts of the world. There were many dentists in England who were medical men, and some of them actually held the Fellowship of the Royal College of Surgeons. There was also a section of the Royal Society of Medicine devoted to odontology.

At times difficulty arose when a doctor, who, for example, was trying to treat a patient suffering from one of the varieties of chronic arthritis, considered that teeth should be removed, but the dentist did not agree with him and sometimes refused to extract the teeth. Both had different outlooks on the question; the doctor was concerned with the patient's health in general, and the dentist was particularly concerned with the state of the teeth. Dr. Graham Brown gave instances in which this difficulty had arisen, and as an extreme example he referred to a particular case in which the patient had a cancer of the floor of the mouth and yet the dentist continued to fill holes in the teeth. He wished it to be clearly understood that he considered that dentists were just as conscientious in their work as other professional men, but that their outlook was different. Conversely, he knew that there were times when medical men condemned teeth which were not at fault. On the whole, he thought that the dentist did not quite realize the importance of a general outlook and was inclined to be guided too much by X ray appearances in diagnosis and treatment. Residual infection was more common than was thought by most people, and many instances could be quoted in which patients, who were suffering from focal infection, had had all their teeth removed and still were no better. The question of a residual infection in the sockets and in the surrounding bone had not been excluded and the patient in consequence showed no improvement. William Hunter had pointed out this fact, and it was obvious to those of the present day that the dentist of that period, who was considered "up to date" and who did excellent crowning and bridge work, was doing more harm than the man who was not so "up to date" and pulled the teeth.

Because a mouth looked clean, it did not mean that there was no infection about the teeth, and the master neck surgeon, Wilfred Trotter, had pointed out that in pharyngeal surgery the patient who had lost all his teeth had a better chance of primary union of wounds after pharyngeal operations than the patient with teeth, no matter how healthy they appeared to be. Dr. Graham Brown's own experience supported this dictum, and he said he was always pleased, when he had to deal with a case of malignant disease about the pharynx or larynx, to learn that the patient was edentulous rather than the possessor of a good set of teeth. The presence of dental disease added to the operative risks and thorough treatment was needed before operation was undertaken.

The statement had been made that evening that the presence of organisms in tissues might not indicate

infection. Both the great men Pasteur and Lister had proved that when organisms had got through the barrier into the tissues infection was established. In nasal accessory sinus disease one found at times that one could obtain pure cultures of organisms from the sinuses, which to all intents and purposes appeared normal, and the radical removal of which sometimes was followed by wonderful results. A tooth might appear to all intents and purposes normal both before and after extraction, yet a culture from its apex might produce a pure growth of *Streptococcus viridans* or *hemolyticus*, which could be the cause of a lot of systemic disease. An innocent-looking tonsil similarly could harbour organisms causing serious general disorders.

Dr. Graham Brown did not object to the term "pyorrhœa" because it was a symptom and not a disease, but he felt that some distinction should be made between the several degrees of infection of the gums. His remarks were made merely to question these different things in order to emphasize that the outlook of the doctor and the dentist was different through their training not being the same. He pointed out that the lion in its natural state was known to suffer from osteoarthritis and had advanced pyorrhœa. The alligator was more fortunate in having his dental toilet carried out by a bird, and, according to some writers, did not appear to suffer from arthritis. The aboriginal in his natural state lived on hard foods, which frequently contained the grit of ashes. He did not suffer from infection of the gums, although his teeth might be ground even level with the gums, but so soon as he ate the food of so-called civilized man, his teeth became affected. Dr. Graham Brown instanced the case of a full-blooded aboriginal woman whom he had recently been treating, who was edentulous and who suffered from advanced catarrhal deafness. She had been brought up with whites since babyhood.

It was now generally recognized, he said, that civilized man ate too much sugar, and Australians up to last year were the highest consumers of this article in the world, averaging about 112 pounds per head of population. Last year, however, Denmark had exceeded Australia by one pound per head. Dr. Graham Brown considered that this excess consumption of sugar had a bearing on many pathological states, such as enlarged adenoids, nasal accessory sinus disease and dental disease. In England, Paton, who had the supervision of a large boarding school for girls divided into a number of houses, found that the inmates of the houses that consumed the most sugar had the most trouble with catarrhal diseases, and that in a large percentage of these girls after a week-end at home, sugar could be found in the urine. The Eskimo was kept on the breast, so it was said, up to the age of fourteen years, and had very good teeth, but, as Dr. Earnshaw pointed out, the teeth of these people showed disease as soon as they adopted the white man's food.

In conclusion, Dr. Graham Brown said that he would like to emphasize again the importance and almost necessity that both professions should have a common outlook on diseases of the gums and teeth. The combined meeting that night would help towards the bringing about of this ideal.

Mr. R. L. DONNAN said that they had had the pleasure of hearing two very carefully prepared papers. Dr. Earnshaw had stressed the question of thorough mastication. It was reasonable to expect that if the jaws were not functioning properly there would be not only a mal-development of the jaws but also of the contiguous structures. In the practice of orthodontics this condition predominated and was usually accompanied by general physical under-development, with positive indications of malnutrition. Mr. Donnan asked Dr. Earnshaw would he consider an adequate, well-balanced diet in conjunction with the exercises prescribed by orthodontists for the development of the muscles of mastication and expression—provided that the teeth were in reasonable occlusion—as sufficient treatment to establish normal development of both jaws. It was surprising how few dentists, when making a dental diagnosis, availed themselves of the

services provided by the medical laboratory. It was only by this means and by a closer professional relationship between physician and dentist that patients could receive the best possible advice and the most intelligent treatment.

Reference had been made by Dr. Rheuben to Richert's findings relative to systemic disturbances resulting from the infected vital tooth pulp. Mr. Donnan quoted a personal case of synovitis of the knee. Several medical tests were made to locate the cause, but without success. Ultimately, after a slightly lame tooth had been extracted, the condition cleared up in two weeks. The pulp of the tooth was found to be vital and proved by microscopic examination to be infected.

DR. NOEL M. GUTTERIDGE said that he had three points to make. First, he quoted the opening sentences from Sir John Orr's recent survey of the food habits of the British people:

The rapid advance in the science of nutrition in recent years has shown that the influence of diet on health and physique is profound. It has been proved that much of the ill-health which afflicts human populations can be attributed directly to deficiencies in diet.

Secondly, Dr. Gutteridge agreed with Dr. Rheuben that the use of the word "pyorrhœa" drew attention to the terminal stages of a pathological process. "It would be no more irrational to think of pulmonary tuberculosis as sputorrhœa than it is to use the word pyorrhœa as a term for periodontal disease."

Thirdly, he referred to a biscuit advertisement that had appeared in the Press which drew attention to the valuable research results of added milk in the diet of school children. The advertisement concluded with the statement that this precious advantage could be secured by including a few buttered biscuits in the child's lunch. He had written to the manufacturer and asked him how many biscuits would be required to be consumed to provide the milk solids equivalent to the daily half pint of milk on which the research studies quoted were based. A reply was received that the advertising "copy" had been used in connexion with the habit of children of soaking their biscuits in milk. The advertisement had been immediately withdrawn as a result of this inquiry.

MR. A. J. HOOLE said it was quite obvious that cooperation of the medical and dental professions was necessary.

With regard to infection as seen by the dentist, if one could manage to prevent it, one would be achieving something worth while. Preventive treatment must necessarily begin while the child was *in utero* with the supply to the expectant mother of foods rich in elements necessary to promote calcium metabolism. This would help the developing and calcifying teeth both with the quantity and quality of the salts. After eruption of the teeth the correct feeding of the mother should be maintained while the child was on the breast. After eruption of the teeth, the child's teeth should receive correct cleansing, and the parents should be instructed as to the choice of diet (minimum amount of sticky carbohydrates, increasing the quantity of ripe raw fruits, greens, whole wheat bread *et cetera*), correct hygiene of the mouth and regular dental inspection.

The next portion of the paper read by Dr. Rheuben dealt with systemic disease. Mr. Hoole agreed that the wholesale extraction of teeth was a serious matter and that both clinical and radiographic aspects should first be studied. The radiogram did not always manifest foci of infection, but, with skilful manipulation *plus* clinical observation, was fairly reliable. As X rays had elucidated some twenty or more years ago the ill-effects of pulpless teeth, so too would they aid in determining the advisability or not of saving certain pulpless teeth.

Dr. Graham Brown had said that every dentist should be a doctor. Mr. Hoole agreed with Dr. Rheuben that it was not essential that this should be so. The course of dentistry in Queensland involved quite a lot of medicine took four years to complete, and was expensive.

Even when a student was newly graduated there was still room for improvement.

The medical course took at least five years, added to which were another couple of years of hospital experience. This added several years to the student's life before any remuneration could be obtained.

For the benefit of those who were not aware of the fact, Mr. Hoole quoted the hours of instruction in various medical subjects in the Queensland dental course:

Anatomy, including practical dissections—

First year	150 hours
Second year	210 hours
Physiology	140 hours
General pathology and bacteriology	60 hours
Special dental pathology	25 hours
Clinical dental pathology	15 hours
Medicine	20 hours
Diseases of ear, nose and throat	6 hours
General surgery	15 hours
General anaesthetics (excluding several demonstrations)	25 hours

In addition to the above, students attended the Brisbane General Hospital and, instructed by a leading physician, visited the wards to see various cases; they also attended a certain number of surgical operations performed by a general surgeon.

Mr. Hoole said he had been particularly interested in both these papers from the point of view of preventive dentistry.

Dr. Rheuben, before replying, wished to pay a tribute to Dr. Earnshaw for a very interesting paper, which appealed particularly to him. No phase of a dentist's or doctor's work was complete without nutrition. The treatment of periodontitis was incomplete without a good diet.

The Oslo experiments almost paralleled Bunting's work of six or seven years ago, the cutting down in amount of sugar per child reducing dental caries from 60% to 6%; the results were practically the same as the first mentioned. It was one thing to be able to lay down a good general diet, and another to get the patient to follow it. Dr. Rheuben quite agreed with Dr. Irwin in his statements about the reaction following multiple extractions of pulpless teeth. This also brought up the question of the dry socket which very often followed the extraction of the pulpless tooth, particularly those with hard dense bone and a poor blood supply. These were mostly in the lower jaw and led to a form of osteitis. If one had the courage, the correct thing to do would be to remove the whole of the surrounding bone with the tooth and then there would be no dry socket. Dr. McDonald had also referred to wholesale extractions. Dr. Rheuben thought that the removal of a mouthful of teeth was really a major operation. He agreed with Dr. Goldfinch that cleaning the teeth was important; if one could not stimulate the gums by eating, it should be done by friction or by brushes. Dr. Rheuben heartily concurred in most of Dr. Graham Brown's remarks; he thought that probably the time would come when every dentist would be a doctor, though to do both courses would take eight years—a large slice of life before earning was commenced. Probably dentistry would split into two sections. Men who had done both courses became very good ear, nose and throat surgeons. He agreed with Dr. Brown that in the case of sick persons one could take no chances, and the sacrifice of pulpless teeth in such circumstances was quite justifiable. The procedure in the Mayo Clinic was that a full mouth radiograph was taken of every patient who entered the clinic. An X ray picture was only a shadow picture, and if treated as such and as an aid to diagnosis, it was very useful. One should not lose sight of residual infection and of pieces left behind. When a tooth was removed without prior examination by X rays, a granuloma left behind might later become a cyst. Removal of impacted teeth could be followed about ten years later by the growth of an adamantinoma. It was not the term pyorrhea that Dr. Rheuben objected to, but the inter-

pretation the public put on it. He agreed with Mr. Hoole in his remarks on preventive dentistry. Dr. Charles Mayo had said that the next great step in preventive medicine must come by preventive dentistry.

Dr. Earnshaw, in reply, thanked those present for their patient reception of his paper, and the various speakers for their kindly remarks. He had found Dr. Rheuben's paper informative. He found that the commonest disease in children in his practice was dental caries. There was a big need to teach mothers that the deciduous teeth needed conserving, and also the dentists that these teeth needed attention.

In reply to Dr. Donnan, Dr. Earnshaw said it had been proved on several occasions that diet had a beneficial influence on dental health at all ages.

In reply to one speaker, who advocated the use of raw milk, Dr. Earnshaw thought that boiled milk was just as good. He did not recommend the actual boiling of the milk. It was sufficient if the milk were heated until a skin was formed on the surface or it began to simmer at the edge. It should then be quickly cooled. If the milk supply were of doubtful origin, it was advisable to boil the milk for three minutes. He thought the warmer climate of Queensland, which necessitated the sterilizing of milk, partly accounted for the low incidence of tuberculosis and the relatively low incidence of dysentery in the past as compared with the rest of Australia.

NOMINATIONS AND ELECTIONS.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Shelton, James Peel, M.B., B.S., 1936 (Univ. Sydney), Sydney Hospital, Sydney.

THE undermentioned have been elected members of the New South Wales Branch of the British Medical Association:

Hughes, Geoffrey Charles, M.B., B.S., 1933 (Univ. Sydney), Sydney Hospital, Sydney.

Loxton, John Cameron, M.B., B.S., 1933 (Univ. Sydney), Royal Hospital for Women, Paddington.

McGree, John Allan, M.B., B.S., 1933 (Univ. Sydney), Beach Road, Bateman's Bay.

Radcliff, John Rothwell, M.B., 1934 (Univ. Sydney), Royal North Shore Hospital of Sydney, St. Leonards.

Taylor, Helen Margaret, M.B., B.S., 1933 (Univ. Sydney), Wentworth Street, Point Piper, Edgecliff.

Correspondence.

MALNUTRITION AMONG CHILDREN.

SIR: Dr. Hilda Bull's report to the Melbourne City Council on children attending the Council's welfare centres has aroused some discussion, and Dr. Dale, Officer of Health for Melbourne, drew attention to the steady rise of malnutrition from the time of weaning to 42% at the age of five years. Close observation would show that that is the fate of almost all children weaned on the absurdly restricted and inadequate diet advocated by health centres and unfortunately spreading far beyond those who actually attend their clinics. Perhaps of normal weight at weaning, they show gross evidence of failure in height and weight by the time they reach three to five years of age, and, worse still, less apparent to the untrained or semi-trained observer but vastly more important, evidences of malnutrition. Having studied this question and written and spoken on it for twenty-five years, I feel I can speak with some authority.

Poverty is a potent, but not the most potent, factor in raising a C3 population. A sensible diet costs little, if any, more than the senseless foods fed to children by parents rich or poor.

Yours, etc.,

W. SPAULDING LAURIE, M.D.

Melbourne,

June 12, 1936.

"THE LAW OF THE SPLIT PELVIS."

SIR: With reference to the very interesting paper by Dr. C. D. Gillies in yours of June 6, might I be permitted to comment on a point which does not appear sufficiently considered or alternatively explained by the author.

It is obvious that one of the most important premises on which rests much of his subsequent logical deductions is found in the acceptance of the "fact" of "the definite disproportion between the foetal head and the pelvic brim" as a characteristic of modern human contrasted with those humans of a hundred or more or less years ago.

Possibly there are convincing arguments unknown to me that can establish as a "fact" that foetal "heads of the race are getting larger amongst civilized people, but the pelvis does not seem to be keeping pace with them".

In view of many circumstances I can scarcely feel that more than a reasonable a priori probability has been shown for the above contention. Nor would I care to accept this as in any way an established fact on which to base even so interesting an hypothesis as is Dr. Gillies's. In this connexion one must consider:

1. The comparative shortness of the period during which we can obtain reliable statistics as to the measurements of human pelvis in relation to the particular heads concerned therewith.

2. The unreliability of clinical observation derived from maternity cases because of the tremendous changes in the circumstances and surroundings of the patient and the profession during recent times.

To explain this: Today the physician attends practically all classes of women. Fifty to one hundred years ago he chiefly saw a selected type—a class that was more normal and better fed. The midwives largely attended the poorer patients, the less normal types, in which there would be a bigger proportion of bony disorder and consequent disproportion. Most of such cases would be unnoticed and unrecorded.

In other words, may not the apparent increase of disproportion be due to the greater scope of the modern practitioner bringing him into contact with a much wider range of cases.

Incidentally, surely modern methods and consequent more refined observation must be considered in this matter, as also must changes in occupation, diet, *et cetera*, of women generally.

To conclude: Would the available statistics, corrected as suggested above, still maintain Dr. Gillies's very important premise?

Yours, etc.,

BURTON BRADLEY.

"Whitehall",
Macquarie Street,
Sydney,
Undated.

CONGRESSES IN NEW ZEALAND.

SIR: Two important congresses of interest to medical men are to be held in New Zealand early next year.

Beginning on January 12, 1937, the twenty-third meeting of the Australian and New Zealand Association for the Advancement of Science will be held at Auckland under the presidency of Sir Douglas Mawson, of Adelaide. The Association's meeting includes a Section of Medical Science and National Health, and the papers and addresses presented to this section at previous meetings have been of

great interest and value to medical practitioners. The Secretary of this section is Dr. J. E. Caughey, of 3, Alfred Street, Auckland. Dr. Caughey is now preparing the agenda for the sectional meeting, and he will greatly appreciate it if medical practitioners and others intending to be present and willing to give papers will communicate with him without delay.

The biennial conference of the New Zealand Branch of the British Medical Association will be held in Wellington from February 23 to 26, 1937. The usual sectional meetings are being held, and it is understood that members of the Association are cordially invited to attend. The conference secretaries are: Dr. J. L. R. Plimmer, 192, Willis Street, Wellington, and Dr. J. O. Mercer, Pathologist, Wellington Hospital, Wellington.

New Zealand's reputation as a holiday resort is well known and needs little comment. To combine a pleasant holiday with the mental stimulus to be gained at scientific meetings of this type makes a real appeal to many of us. No doubt many practitioners will seize upon the opportunity.

Yours, etc.,

A. R. SOUTHWOOD.

168, North Terrace,
Adelaide,
June 17, 1936.

Analytical Department.

"PROTEX."

"PROTEX" is a product of Colgate-Palmolive-Peet Company Limited. It is described as a triple-milled antiseptic toilet soap that will not waste away quickly. The essential ingredient is ti-tree oil (the oil of *Melaleuca alternifolia*). A sample of this soap was submitted to our analysts, who make the following report.

The bactericidal action was tested against broth cultures of *Bacillus typhosus* (Rawling's strain). On each occasion of testing the strain of *Bacillus typhosus* was subcultured in broth for the three preceding days and the third subculture was used. Of this broth culture 0.1 cubic centimetre, containing approximately 2,000 million organisms per cubic centimetre, was inoculated into 5.0 cubic centimetres of emulsion of the soap of varying strengths.

Owing to the difficulty of keeping the soap in emulsion in a strength of 1 in 10, it was difficult to determine accurately the killing time of the soap at this strength of emulsion. Conflicting results were obtained at each time of testing.

It was found that an emulsion of a strength of 1 in 20 of the soap killed *Bacillus typhosus* in five minutes, though not in two and a half minutes. A strength of 1 in 25 of soap emulsion killed *Bacillus typhosus* in seven and a half minutes, but not in five minutes, and a strength of 1 in 30 of soap emulsion killed *Bacillus typhosus* in ten minutes, but not in seven and a half minutes.

Under the same conditions of testing it was found that a solution of carbolic acid of a strength of 1 in 130 killed *Bacillus typhosus* in seven and a half minutes, but not in five minutes. This gives a Rideal-Walker coefficient for the soap of 0.19.

This hard-base soap may be recommended as a pleasant and useful antiseptic toilet soap.

Obituary.

HAROLD VICTOR CANTOR.

We regret to announce the death of Dr. Harold Victor Cantor, which occurred on June 3, 1936, at Wrenbury Hall, Nantwich, England.

Books Received.

DISEASE IN CHILDHOOD: A CLINICAL STUDY, by R. S. Frew, M.D., F.R.C.P.; 1936. London: Macmillan and Company Limited. Royal 8vo, pp. 684, with illustrations. Price: 30s. net.

CARDIAC OUTPUT AND ARTERIAL HYPERTENSION, by S. A. Gladstone, M.D.; 1935. New York: Published by the author. Royal 8vo, pp. 56, with illustrations. Price: \$1.00 net.

THE OPERATIONS OF SURGERY, by R. P. Rowlands, M.S., F.R.C.S., and P. Turner, B.Sc., M.S., F.R.C.S.; Eighth Edition; Volume I; 1936. London: J. and A. Churchill Limited. Royal 8vo, pp. 1055, with 435 illustrations, of which 38 are in colour. Price: 36s. net.

ABORTION SPONTANEOUS AND INDUCED: MEDICAL AND SOCIAL ASPECTS, by F. J. Taussig, M.D., F.A.C.S.; 1936. St. Louis: The C. V. Mosby Company; Melbourne: W. Ramsay (Surgical) Proprietary Limited. Super royal 8vo, pp. 536, with illustrations. Price: £2 5s. net.

HIS PATIENTS DIED, by C. Lillingston; 1936. Edinburgh: William Blackwood and Sons Limited. Crown 8vo, pp. 317. Price: 7s. 6d. net.

Medical Appointments.

Dr. K. A. McCarthy has been appointed, pursuant to the provisions of the *Workers' Compensation Act, 1923*, of Victoria, to be Certifying Medical Practitioner at Footscray.

Dr. W. R. James has been appointed Honorary Medical Officer at the Wallaroo Hospital, South Australia.

The undermentioned have been appointed, under the *Navigation Act, 1912-1935*, to act as Medical Inspectors of Seamen: Dr. J. L. O'Connor (Department of Health), Dr. A. A. Heath (New South Wales), Dr. A. W. St Ledger (Queensland), Dr. A. H. E. Watson (South Australia) and Dr. N. B. G. Abbott (Tasmania). Dr. J. L. O'Connor and Dr. G. F. Lumley have been appointed Medical Inspectors of Shipping.

Dr. H. G. Wallace has been temporarily appointed Director-General of Public Health and Chief Medical Officer of the Government, Inspector of Schools of Anatomy, Commissioner under the *Veneral Diseases Act, 1918*, a Member of the Board for the Protection of Aborigines, and President of the Board of Health, New South Wales.

Dr. H. K. Fry has been reappointed an Official Visitor to the Parkside Mental Hospital, South Australia.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser", pages xviii, xix, xx.

AUSTIN HOSPITAL FOR CANCER AND CHRONIC DISEASES, HEIDELBERG, VICTORIA: Honorary Ophthalmologist.

FREMANTLE HOSPITAL, FREMANTLE, WESTERN AUSTRALIA: Junior Resident Medical Officer.

HOBART GENERAL HOSPITAL, HOBART, TASMANIA: Resident Medical Officers.

PUBLIC SERVICE BOARD, SYDNEY, NEW SOUTH WALES: Medical Officer.

ROYAL MELBOURNE HOSPITAL, VICTORIA: Medical Officers.

SAINT VINCENT'S HOSPITAL, SYDNEY, NEW SOUTH WALES: Honorary Dental Surgeons.

THE UNIVERSITY OF SYDNEY, NEW SOUTH WALES: Fellowship in Urology, Chair of Psychiatry.

YALLOURN MEDICAL AND HOSPITAL SOCIETY, YALLOURN, VICTORIA: Medical Officer.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment referred to in the following table without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

BRANCHES.	APPOINTMENTS.
	Australian Natives' Association. Ashfield and District United Friendly Societies' Dispensary. Balmmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham United Friendly Societies' Dispensary. Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney. North Sydney Friendly Societies' Dispensary Limited. People's Prudential Assurance Company Limited. Phoenix Mutual Provident Society.
NEW SOUTH WALES: Honorary Secretary, 135, Macquarie Street, Sydney.	
VICTORIAN: Honorary Secretary, Medical Society Hall, East Melbourne.	All Institutes or Medical Dispensaries. Australian Prudential Association, Proprietary, Limited. Mutual National Provident Club. National Provident Association. Hospital or other appointments outside Victoria.
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane.	Brisbane Associate Friendly Societies' Medical Institute. Proserpine District Hospital. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY Hospital are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.
SOUTH AUSTRALIAN: Secretary, 207, North Terrace, Adelaide.	All Lodge appointments in South Australia. All Contract Practice Appointments in South Australia.
WESTERN AUSTRALIAN: Honorary Secretary, 205, Saint George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND (Wellington Division): Honorary Secretary, Wellington.	Friendly Society Lodges, Wellington, New Zealand.

Editorial Notices.

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